Light and Lighting

Vol. ~~XLVIII.~~ ~~No. 9.~~ ~~SEPTEMBER, 1955~~ Two Shill

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Vol. XLVII.—No. 1
January, 1954

Published by The Illuminating Engineering Publishing Co., Ltd., on the 1st of each month, at 32, Victoria Street, London, S.W.1. ABBey 7553. Subscription rate 25s. per annum.

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Luminaire

ON the whole, the evolution of a satisfactory lighting vocabulary is proceeding without unreasonable tardiness, but it is remarkable that no appropriate generic name has yet been generally accepted for that indispensable class of objects comprising light sources in combination with " shades," " globes," " fittings," " fixtures," " reflectors," etc. One of the pioneers of illuminating engineering, Benjamin Thompson, Count Rumford (1753-1814), used the name " Illuminators." But people who decorate manuscripts and adulatory addresses call themselves Illuminators, so that Count Rumford's term would not now exclusively denote the class of objects for which a proper name is needed.

Thirty years ago, our American friends proposed the term *Luminaire*. The definition—as reported to the Sixth Session of the Commission Internationale de L'Eclairage at Geneva in 1924—was, " A *Luminaire* is a complete lighting unit consisting of a light source, together with its direct appurtenances, such as globe, reflector, refractor, housing and support. The term is to designate completely equipped lighting fixtures, wall brackets, portable lamps, or so-called removable units." Why has this useful and suitable term been cold-shouldered in this country for so long, and such devotion shown to the unimaginative, double - barrelled makeshift " lighting fitting " and the equivocal " lighting unit " ? If it has been beyond the wit of our own lighting engineers and lighting equipment makers to find a better name than " luminaire," why not welcome the term to the lighting vocabulary ? This French word is already widely used, not only in the country of its original sponsors, but also, for example in Australia. It is well on the way to becoming international, and we think it so worthy of general adoption that we are anticipating the event by taking it into editorial usage forthwith.

Notes and News

1954 Summer Meeting

It seems only a short while ago that we were reporting the Eastbourne summer meeting and it comes as something of a surprise to learn that it was over 18 months ago and that preparations for another summer meeting are well in hand. We recall that after Eastbourne everyone was saying that it was the best ever and was looking forward to getting his 1954 diary to ensure that he didn't overlook the next one. You now have your 1954 diaries, so note the date and place—**May 18 to 21 at Southport.**

Before commenting on the programme which has been arranged we would like to draw attention to one point which does not seem to have been fully appreciated in the past. Many of our readers who are not members of the I.E.S.—and there are many of them—have assumed that participation in the summer meetings is open only to members of the society. That is not so. The meeting may be attended by both members and non-members of the society; the only differentiation between members and non-members is that the registration fee is less for members than for non-members. A glance at the summaries of papers to be given at Southport will show that the field of interest of every paper is very wide. The accent this time is on the practical applications of lighting.

Dr. Aldington, who is giving a paper on lamps and their uses, will perhaps forgive us if we say that he is one of the star lecturers of the I.E.S. Should there be anyone, and we doubt it, who has any interest in lighting and who has not heard Dr. Aldington lecture then we invite him to come to Southport to endeavour to disprove our description. Street lighting has not previously figured in a summer meeting programme but the paper this time certainly looks of the down-to-earth practical type. Many local authorities with problems such as those faced by the Harrow U.D.C. in 1945 will be interested in this paper by Mr. Durbridge.

No one who has been to France could have failed to notice how the French have a flair for using modern light sources so that they are decorative; their wildest ideas seem to work. Andre Claude is one of the leading exponents of this art and in his paper at Southport he will tell us how the colour, brightness, shape, etc., of our modern light sources have been used in his country in such a way that they not only do not offend but actually make a valuable contribution to the visual scene. Papers by overseas visitors have become a tradition at the summer meetings and this paper by Andre Claude should be particularly interesting and useful.

London members of the I.E.S. will remember that a year or two ago a very successful informal meeting was held when the subject of lighting in the home was discussed. The meeting was an informal one because in spite of the efforts of the papers committee over a number of years no one had been bold enough to offer a paper or been rash enough to allow himself to be forced into preparing one. The paper to be given by A. H. Young and C. J. Misselbrook will therefore be the first paper on this subject for many years. There is great interest in the subject and it is one which will appeal to the ladies.

Lighting for plant growth is a subject which has caught and held our attention during the last few years. Mr. A. E. Canham, of the Electrical Research Association, has given a number of talks on the subject and also contributed an article to this journal a few months ago. There has, however, been no authoritative paper on the subject for a number of years and it is time that our knowledge of the subject was brought up to date. Previous talks and articles have dealt mainly with the theoretical aspects of the effect of light on plant growth but we have now reached the stage where the theory has been put into practice so that special lighting to bring on early crops has become a commercial proposition.

One of the technical sessions is to be given over to a series of four short papers, each of which will deal with the economics of a different type of industrial lighting installation. A point of interest is that none of the four authors is directly connected with the lighting industry; they are all either consulting engineers or factory engineers. This session and the discussion on the papers should be very lively. Each of the authors will be talking about a particular installation; Mr. S. T. Clark will deal with the hot cathode fluorescent installation at the Henry Lister woollen mills at Pudsey; Mr. W. Howe with the cold cathode installation at the Rolls-Royce factory; Mr. F. Jones with the high bay mercury installation at the factory of Babcock and Wilcox, and Mr. G. W. S. Levey with the blended light installation at the Steel Company of Wales. There will, therefore, be plenty of material for discussion—and we understand that the programme is arranged to allow plenty of time for it.

The programme will also include a number of visits to factories and installations in the area.

Of particular interest will be the revival at Southport of a popular feature in London before the war (and one which has been continued in Birmingham) of having a display of new lighting equipment. We have been asked to make it clear that this is not an exhibition but we gather that new fittings, devices, etc., which will be of interest to lighting people will be displayed one evening.

There will also be the usual social events including a civic reception on the opening evening, a dinner-dance and items for the ladies. Fuller details of the programme will be available later in the month and will be circulated direct to I.E.S. members. Others who require further details and registration forms should apply to the I.E.S. secretary at 32, Victoria-street, London, S.W.1.

New German Code

The German Standards Association has just issued a new code of recommendations for the artificial lighting of buildings (DIN 5035). Although technically a revision of the code published in 1935, it is practically a new document and approaches the subject in a way which accords with modern ideas on lighting design.

The lighting required for a particular room, or a particular purpose, may fall into any one of six classes designated respectively as very low, low, moderate, high, very high, and special. For each class an appropriate value of general lighting, ranging from 3 to 60 lm./ft.^{2} is recommended. In the higher classes, however, if a recommended higher value of illumination is provided over the work area (the range for this is 25 to 400 lm./ft.^{2}) the general illumination need not exceed about 8 per cent. of this higher illumination. Recommendations are then made regarding the degree of shadow desirable and the direction of incidence of the light. The diversity, defined as the ratio of the minimum illumination to the average, should not exceed 1 : 2.5 for the lowest two classes or 1 : 1.5 for the others. Glare, including reflected glare, is treated descriptively, and so is the subject of colour.

The third and largest section of the code deals with the lighting requirements of particular rooms and kinds of work. For instance, in the case of schools, the different rooms are grouped, and for each group one of the classes of lighting referred to earlier is recommended. The same method is used in the cases of shops, domestic premises and hospitals. For factories, however, the various processes in a particular industry are grouped in six categories corresponding to the six classes of lighting. Twelve principal industries are treated in this way. A final section of the code deals with maintenance.

The guidance given as regards the value of illumination to be recommended for a particular task is not nearly as precise as in the I.E.S. Code ; more is left to the judgment of the lighting engineer, and this may be thought to have certain advantages, but the statement of the general principles of good lighting is also less detailed and, all things considered, there is little doubt as to the relative value of the two documents to those who have to decide on the best lighting for a particular purpose.

The I.E.E. and Illuminating Engineering

It has long been felt by many lighting engineers that illuminating engineering should be among the subjects which could be offered in the final examination of the Institution of Electrical Engineers. Lighting, they have argued, is one of the subjects which a practising electrical engineer may well desire to make one of his primary interests. Electricity boards and local authorities, as well as contractors, should have someone of professional status available to advise on lighting matters, although they may not feel justified in having a full-time lighting specialist.

This view has evidently now been accepted by the I.E.E., for in the new examination regulations just issued by the Institution, lighting is one of eight options which may be offered in the final part of the examination. The whole structure of the Institution examination has now been altered. Instead of two sections there are now three parts to be taken. The new Part I is similar to the old Section A, but Part II is of " intermediate " standard. Part III, which, as the final, corresponds to the old Section B, consists of advanced electrical engineering and two specialist subjects selected by the candidate from a list of eight. One of these subjects is " Illumination Engineering."

A study of the syllabus in this subject shows considerable similarity with the syllabus of the City and Guilds Intermediate examination, although there is, naturally, no mention of gas or of daylight. On the other hand there is a section on colour. The standard expected may not, of course, be the same as for the C. and G. It should be possible to make some guess about this when the specimen examination papers for Parts II and III have been published.

What effect this new arrangement of the I.E.E. examination will have on the City and Guilds examination it is difficult to forecast. It is, however, to be expected that there will be a demand for classes in illuminating engineering at a number of those technical colleges which prepare students for the I.E.E. examination, and probably those students who wish to take the C. and G. examination will find such classes very suitable for their purpose.

Showroom lighting at Powers-Samas Accounting Machines Ltd., Holborn, London. (Courtney, Pope (Electrical) Ltd. photo)

Random Review of 1953

Some comments on progress and developments in the lighting industry and on the application of light sources and lighting equipment during the past year.

By A. G. PENNY

It is a frequent complaint that scientific developments now take place so fast that their proper digestion by the world is not possible and the plea is continually made for some means of delaying the introduction of new ideas until they are properly cooked. There are times, however, when I think that the present age is providing its own brake—in the form of committees. As a member of many committees—too many—I often think we must make a real effort to shake off this committee mentality and delegate authority once more to individuals and learn to accept the individual's solution—even if it is not our own—rather than argue interminably in committee and finally find ourselves reduced to accepting a compromise solution containing all that is worst.

In a small industry such as the British lighting industry it seems to me that we are in grave danger of wasting the time and energy of our very limited man-power by making our experts sit on committees instead of getting on with the job. Could we not somehow go back to the practice of appointing individual experts (or a small team) for a particular task? I wonder what would have happened to the roads of Britain if Telford had spent all his time as a member of the B.S.I. Committee on a Code of Practice for Road Design?

However, this is supposed to be a review of progress rather than the reverse, and in looking back on 1953 we naturally remember all the decorative lighting that was associated with the pageantry and solemn ceremony of June 2. I do hope that in the years to come we shall not forget what a difference a little decoration can make to life. Decorative lighting need not, as we saw, be on a lavish scale; in fact it is perhaps best used like sauce, in small quantities and with discretion.

I.E.S. Activities

During the past year the I.E.S., under the presidency of Dr. Wellwood Ferguson, has received a number of very interesting papers on subjects which do not normally get much attention from the ordinary member and we have to thank Dr. Ferguson for stimulating the Society's activities in this way. We have had our old friend H. C. Weston once again asking the awkward question—and answering it. This time it was a study of Visual Fatigue and I thought it formed a good introduction to the complex question of the Nervous Reactions of the Retina, which was the subject of Professor Adrian's Trotter-Paterson Memorial Lecture delivered soon afterwards. Both authors seemed to have the delightful faculty of making the obvious crystal clear. I liked especially Adrian's reference to a light source with an abnormal spectral distribution as being comparable to putting sugar on a boiled egg.

It is interesting in retrospect to compare the paper by Medd on Colour in Schools with the papers by Logan and Kalf at last year's Summer Meeting; I thought Medd's attitude might well be placed between those of the others. Logan made everything so simple that nobody could make a mistake—or a great success—whilst Kalf was prepared to leave undone some jobs in order to achieve the masterpiece. Similarly the papers at the one-day meeting at Nottingham, by Professor Cotton of Nottingham University and Mr. Asher of Birmingham University, made an attempt to widen the horizon of the ordinary member. It was a very commendable attempt which I hope will be repeated (but next time, please, in a hall with better acoustics).

On the other hand the more practical interests of members have been catered for by the discussion on the Lighting of Office Buildings and by Peirce's paper on Sports Lighting, which once again prompted the remark that the first essential of a lighting engineer is his ability to recognise and analyse the visual task to be performed, whether it is kicking a football or operating a capstan lathe. Mention must also be made of the informal meeting at which I.E.S. students showed their paces. Not only was I struck by what they had to say, but more particularly by the way they said it. Those who only read the address given by Mr. Maclurcan at the A.G.M. can have but a faint idea of the impact of his personality on the audience. Those of us who were fortunate enough to hear him will never forget a unique mixture of charm, wit and good sense.

Looking back through recent issues of *Light and Lighting* in an endeavour to remember what I should not have forgotten (an inevitable task for those who are rash enough to write reviews and don't keep diaries) I am again struck by the widening interests of the lighting engineer. That there is a rapidly growing knowledge—real expert knowledge—of the technicalities of lighting is well appreciated and indeed is taken for granted. What is perhaps less understood is that a real appreciation of many of the other aspects, artistic, psychological, economic and so on, is also growing rapidly. John Betjeman may still rail about incongruous lamp posts, but he is wasting his breath in talking to lighting engineers—they are already on his side; no longer is a reference to the work of the Council of Industrial Design the signal for raucous laughter. In the studies of, say, the economics of street-lighting, there is a vast difference between the elementary calculations of pre-war days, which rarely got beyond the "cost per million lumen-hours" stage, and the complex studies of to-day, which analyse the whole

operation from the cost of raising the money to pay for the initial installation to comparisons of the economics of a power-operated tower wagon as compared with a manual one.

Of all the meetings of the I.E.S. held this year none, I think, was more interesting than the special meeting in February to award the first Dow Prize. Details of the prize-winning entries have been described fully in *Light and Lighting*, but I think it a pity that we are left with no record of the many other entries which were displayed at the Lighting Service Bureau for such a short time. It is, I suppose, one of the consequences of not having a permanent home that the I.E.S. cannot stage more frequently those exhibitions of members' work which are such a source of interest at, say, the headquarters of the Royal Photographic Society or the R.I.B.A. Nevertheless it was encouraging to see such evidence of enthusiastic collaboration between architects and lighting engineers. We may in due course hope to see more examples of their work translated into practice. Which reminds me that the new "Time and Life" offices in New Bond Street must be reported as one of the outstanding examples of recent collaboration between architect, artist and engineer.

By comparison the competition on lighting fittings organised by the Royal Society of Arts seems to have gone almost unnoticed; which is surprising as there are not many opportunities for young designers of lighting fittings to win a bursary of £150. It is to be hoped that the 1953 competition receives better support.

Although not strictly an I.E.S. affair, British delegates to the annual conference of the Association Française des Eclairagistes, at Dijon last May, were at one in declaring that the proceedings and the scientific papers presented are rapidly establishing the conference as an important meeting for European lighting engineers.

Lamps

The new colour corrected mercury lamps mentioned in the last Random Review are at last on the market in this country, in the 80- and 125-watt sizes, and it is possible that higher wattages may soon be available. The relative merits of the three rival phosphors, arsenates, germanates and silicates, are coming to be more clearly understood, but it is by no means certain that eventually any one of these phosphors will supplant the other two. Rather there seems a tendency to use all three, according to the particular design of lamp—germanates for the highest wattages and silicates or arsenates for lower-powered lamps on account of their temperature requirements. So far as this country is concerned it is a matter of some disappointment that only now are the lamps becoming available, and only in the smallest and least-useful sizes. Mr. Boereboom, the chief Belgian street-lighting authority, said to the A.P.L.E. at Liverpool that his country had now in service over 8,000 such lamps, whilst in the United States 400-watt lamps have been on sale for some years, and recently 1,000-watt lamps have been marketed. The new lamps have a red ratio of seven per cent. as against five per cent. for the old type of mercury fluorescent lamp and one per cent. for the plain mercury discharge lamps, and this entails a marked improvement in colour-rendering properties, more so than is indicated by measurement of percentage red ratio. Their efficiency, life and lumen maintenance are the same as those of the plain mercury lamps with which they are interchangeable, having the same bulb sizes and caps.

The applications of the new mercury fluorescent lamps have yet to be fully investigated, but these are likely to be most interesting and will be discussed at some length later in the section dealing with industrial lighting.

Controversies over the colour of fluorescent tubes still rage both in front of customers and within the walls of research laboratories, and it is impossible to say when, or even if, anything will ever come of them. I would like to put forward a plea that when opinions concerning the colour and colour-rendering properties of fluorescent tubes are required very careful consideration should be given to the question of who is qualified to give such opinions. Trials ought to be on a reasonably large scale, and responsible, experienced users must be given a proper opportunity of appraising possibilities and giving their opinions. Colour preference is almost as much a personal matter as religion, and there is consequently great difficulty in judging what the customer really wants without letting one's own preference bias the conclusion. It may be significant that the American Warm White (previously Warmtone or Warmtint) and its less efficient but better colour-rendering companion Warm White Deluxe have advanced sufficiently in parts of the world outside Britain during the past two or three years for them to be proposed as international standard colours. This means that they are considered by many to be worthy of places in the world's standardised range of fluorescent tubes (see *Light and Lighting*, July, 1953, page 275). These tubes have a colour similar to tungsten lamps, and it is perhaps a little odd that this country, so well known for its conservative approach to new matters, did not originally market a fluorescent tube with tungsten colour. Of course, when one considers the distortion of colour introduced by tungsten lighting with its negligible amount of blue radiation and its shocking excess of yellow and red, it is understandable for the scientists to have determined to rid this world once and for all of this appalling travesty of daylight. The wonder is rather that the populace—after being wedded for millions of years to dull yellow light sources when the sun has not been around—has not obstinately refused the advances of the newcomer. But there it is; in matters of personal taste the supplier cannot neglect popular demand, albeit he may lead it forward very, very gently. Despite all this, however, there is to be noted a growing understanding of the proper use of the various colours available, even of the more exotic ones such as mellow.

Cold cathode fluorescent tubes are being used out of doors now with less risk of the end darkening that I mentioned last year. Two methods of preventing the trouble are being used; either an outer jacket is provided or a new type of electrode mounting is used which effects replacement of mercury which has migrated to the centre or coldest part of the tube.

There are now several types of coloured filament lamps for exterior decoration purposes; those which have the colour filter on the inside of the bulb and those which have it on the outside, but all have a colour filter which is diffusing and robs us of the sparkle which is obtained when the filament can be seen, as through a clear-coloured lacquer. There is at least one coastal resort which uses such coloured lacquers and coats the bulbs itself, because it feels strongly that in lighting it is the small fragments of extreme contrast, whether of brightness or

colour, which delight the eye. Clear lacquers at present available are not very durable. Will not some lamp manufacturer come to the rescue!

A 75-watt reflector spotlight is now available as well as the 150-watt type which has been on the market for some time, but of special interest is, I think, the Philips 500-watt reflector spotlight, which did good work both in and out of water at the time of the Coronation. The bulb is of hard glass and for operation under water electrical connection is made within a watertight lamp holder.

Lamps with soft glass bulbs may also be used in contact with water, but it is advisable to have the bulb as thin as possible to reduce thermal stress. A 1,000-watt A1 projector lamp with an especially thin round bulb has been used for under-water television lighting, and has been tested under pressures up to 600 lb./in.^{2}, which would be experienced some 1,400 ft. below the surface of the sea. Many years ago I was concerned with the development of lamps for divers, and at that time we used extra thick bulbs, never realising that the occasional failure was due to thermal stress rather than mechanical weakness.

Street Lighting

It is pleasant to record that interest in street lighting is very much " world wide " and that British-made equipment is going overseas in considerable quantities. Street lighting is a field in which, I think, we can lead the world.

This branch of lighting is for me, personally, a most fascinating subject, perhaps because I am a motorist and do a lot of night driving. In a single short drive one may pass through many different installations, good, bad and indifferent, each one some sort of an attempt at a solution to more or less the same problem. It is a great joy to find that a stretch of road which was badly lighted has been relighted well and I have to admit, in spite of my comments last year, that such joy is fairly frequently experienced now. Many excellent installations have been put up and the idea of the gradually expanding installation is welcome, as witness the installation of sodium lighting which now embraces Stanmore, Harrow Weald, Hatch End and Northwood in Middlesex.

A special effort is being made at the present time to reduce road accidents, as those who have renewed their driving licences recently will know, and one method being employed is improvement of the lighting, especially at " black spots." Cold shivers sometimes go down my spine when I contemplate the danger that lurks in the dark patches, especially for defenceless pedestrians whose simple faith in zebra crossings is not always warranted. How is a pedestrian to know whether a motorist can see him or not? The requirements of a street lighting installation, as have been so ably propounded by J. M. Waldram, are seldom, if ever, fully met with in practice and I am convinced that jay walkers have no idea of the risks they run. Many of the " black spots " are literally black spots and I wish even more was being done to lighten them.

The sodium versus mercury contest is still in progress but reports indicate that sodium is becoming the more popular for Class " A " road lighting and the most interesting article on Discomfort Glare by Ferguson, Reeves and Stevens published in the *Electrical Review* of August 14, 1953, may provide a clue to the real reason for this. Laboratory tests have shown that the colour of the light source, quite apart from other factors, may have a profound influence on glare. At a recent gathering of persons responsible for street lighting a vote of two to one in favour of sodium was recorded when the question " Do you prefer sodium or mercury street lighting? " was asked. Nevertheless, many new mercury installations are being put in both in this country and abroad, especially abroad, and the issue is by no means settled.

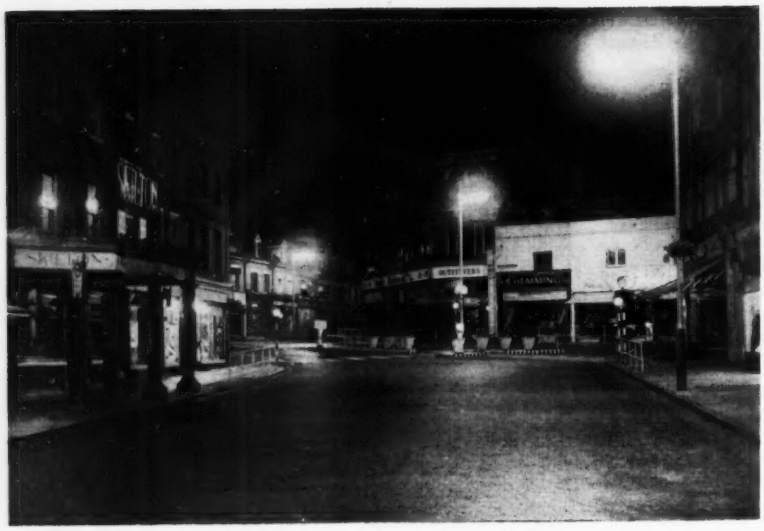
I am, however, not converted from the belief that if there are pedestrians about the colour discrimination afforded by mercury is well worth having. Too often in a sodium installation have I all but overlooked the stationary pedestrian hovering on the kerbside before risking his neck. As soon as he moves I can see him but by then it could be too late. Further, as a pedestrian and a motorist, in a sodium installation I find difficulty in judging the speed and distance of an approaching car, and, of course, sidelights are noticeably more glaring than in other systems.

Fluorescent street lighting continues to increase in popularity and some really large installations now exist, notably one of 150 G.E.C. lanterns at Bromley, Kent. It was interesting to hear from Mr. Boereboom at the A.P.L.E. conference that the streets of Charleroi, in Belgium, are now lighted entirely with fluorescent tubes. The use of wall-mounted fluorescent lanterns such as may be seen at Harlow, Essex, is worthy of note; the advantages of this type of lighting are obvious but, of course, it is probably only practicable for lighting fairly narrow areas where the light from the lanterns on one side can adequately light the faces of the buildings on the other. Nevertheless, there must be in this old country of ours many miles of such narrow streets from which poles could be banished.

Another example of this sort of mounting is the use of Siemens " City " lanterns to light some of the narrow streets in the City of London. Each lantern houses three 5-ft. 80-watt fluorescent tubes and it was found necessary to mount the lanterns with their major axes vertical because, unlike the buildings at Harlow which were all built at once to a uniform design, the buildings in the City are all different. This made it impossible to get uniform mounting height and spacing with fittings mounted horizontally. Vertical mounting does not materially alter the effectiveness of the light distribution and the appearance of the installation is pleasing.

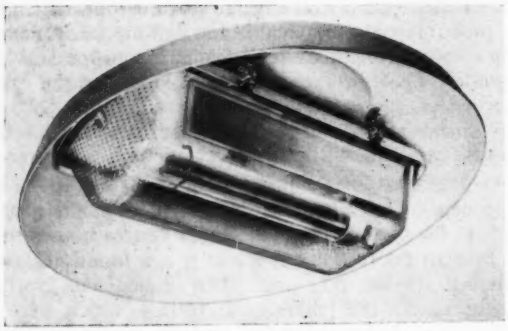
Cold cathode fluorescent tubes in special G.E.C. fittings have been used to light the large square known as the Pier Head at Liverpool, the idea being that the lanterns shall remain up for four or five years with practically no maintenance, after which time they will be removed bodily for reconditioning. Whether this will, in fact, turn out to be a good idea remains to be seen. Each lantern contains five 9-ft. hairpin-shaped tubes.

Street lighting in the vicinity of airfields has been receiving special attention and the Ministry of Transport has issued a specification. This leaves nothing to chance and each lantern has to have an incorporated levelling device which will indicate the angular setting to within $\frac{1}{2}$ deg.; another thing for the maintenance man to check every time the lantern is serviced! Among lanterns complying with this specification is a neat and simple modification of a normal G.E.C. lantern, as shown in the illustration. In the past it was the practice to use



Fluorescent street lighting at Bromley, Kent. (G.E.C. photo)

(Below). *A cylindrical refractor lantern for street lighting. Designed to accommodate two of the new type* 125-*watt mercury fluorescent lamps.* (Holophane photo)



(Above). *A sodium street lighting lantern for use in the vicinity of airfields.* (G.E.C. photo)

Fluorescent street lighting at Harlow, Essex, employing wall mounted lanterns. (G.E.C. photo)

cut-off lanterns near airfields, and this meant using spacings of about 90 ft.; the new lanterns have non-cut-off distributions in spite of the restriction of upward light and thus greater spacings of 120 ft. or so may be used.

I am sorry to note that uni-directional street lighting lanterns, originally intended for the lighting of double carriageway roads, are now used mainly for the lighting of railway marshalling yards. Is it just that the B.S.I. recommend 3,000-8,000 lumens per 100 ft. of Class " A " road and the authorities cannot believe that a better job can sometimes be done with about half as many lumens ? Seeing is apparently not believing in this case.

Side road lighting is further down in the melting pot than main road lighting and all types of light source are being installed. Experiments have been made with the new 80- and 125-watt mercury fluorescent lamps, but so far no definite conclusions have been reached. The levels of illumination are low enough to make the difference between the colour-rendering properties of the plain mercury and the fluorescent mercury lamps less appreciable than might be expected from a comparison at, say, 20 ft.c.† The illumination even close to a lamp-post is only of the order of 1 ft.c. Nevertheless their use in Belgium and Holland is an indication of their value, and the higher wattage lamps of this type which are coming will be of great use in situations where money for higher illumination values can be obtained.

Holophane have brought out an interesting lantern in response to the introduction of the new type of 80- and 125-watt mercury fluorescent lamps. The lantern accommodates *two* such lamps.

It is becoming more widely appreciated that Class " B " road lighting is a study of its own and cannot be regarded as a scaled-down version of Class " A " road lighting. For economic reasons it is not always possible to light side roads as well as we might wish, and a view of any large town at night from the air will reveal the marked difference in practice between Class " A " and " B " roads, the clear-cut lines of main-road lighting standing out very distinctly in contrast to the unintelligible clutter of the side-street lighting. One factor not to be overlooked is that the purpose of the installation is to light the pavements and gardens as well as the road —some say at least as much.

In some parts of the country another class of road, intermediate between " A " and " B," seems to be recognised, and this might perhaps be described as minor bus routes. A mounting height of 20 ft. has been used and, as with Class " A " roads, emphasis is on the needs of the motorist.

This brings me to the question of car lighting. Although there is little new in the way of car bulbs, the quantity of bulbs now thought necessary by all car manufacturers must begin to be an appreciable item in the motorist's budget.

So far as headlights are concerned it seems to me that an improvement in road manners has involuntarily resulted from the more precise design of modern lights. Modern cars now have such " good " headlights that they are an intolerable source of glare if undipped. Consequently any driver of a modern car has a powerful weapon with which to counter undipped headlights and, like two opposing Powers with atom bombs, respect, if not amity, is achieved with a readiness to dip which did not exist in the old days when only large and expensive cars had headlights powerful enough to compel another to dip. Even in the dipped position glare is still considerable, and it is of interest to note that Holland has now made compulsory the use of Graves-type headlights in which the dipping filament is shielded with a metal hood, thus giving a sharpness of beam cut-off which can be achieved in no other way.

The impending introduction of flashing trafficators will further complicate the problem of seeing for the motorist, and this gives point to the criticism of flashing beacons at zebra crossings in that there are so many distractions to which the eye *involuntarily* turns that the real objects of danger may easily be overlooked.

When approaching a single zebra crossing at night the two flashing beacons are bad enough, but when coming to a road junction or intersection the situation is execrable. The unsynchronised flashing of three or more pairs of beacons is for me pure distraction, a menace to safety. Who could concentrate on preserving pedestrians when confronted with these galaxies of blinking lights ? Perhaps I take my parafoveal vision too seriously, but I believe synchronised flashing to be a real necessity. Similarly, the recently announced regulations in regard to twin rear lights and reflectors have their drawbacks as well as their advantages. But until enough money is provided for street lighting so that vehicle lights are prohibited in built-up areas, I suppose these or similar problems will be with us. (Regular readers will deduce that I do not write under the pseudonym " Lumeritas.")

Floodlighting

Apart from decorative lighting for the Coronation, I must confess a feeling of disappointment over floodlighting. Somehow it all seems very " ordinary " and I cannot help thinking that the past few years have not shown that imagination which characterised British floodlighting in the thirties. In France, on the other hand, what started out before the war as an advertising stunt by the Compagnie des Lampes has become a standard method of attracting tourists to the local beauty spots and is paid for out of local funds. So popular has it become that the world-famous Michelin Guide has now produced a special map " Illumination en France " (complete with information regarding the nearest hotel !) describing all the floodlit castles, cathedrals, and the like. Some of the beauty spots even have stereophonic sound interludes evoking sensations of past grandeur. An enterprising floodlighting engineer could with advantage to his employer make a tour of some of the outstanding installations — and it would not be without some incidental pleasures !

Versailles itself has had this sort of treatment on a grand scale and has attracted Parisians in their thousands; so much so that it is confidently expected that the cost of a most elaborate sound and vision installation—complete with underground cables and floodlights that retract into sunken pits during the daytime—will be paid for in two years. (Shades of Battersea Park !) And, incidentally, I learn that the colour effects are obtained by coloured anodised reflectors in place of ordinary glass

† Foot-candle. A unit of illumination, sometimes called lumen per square foot.

filters—on the score that filters are not obtainable in a "sympathetic" range of colours.

Shoplighting

Looking back over the past year, I feel it is too brief a period of time when searching for finite developments in lighting technique; where shops and stores are concerned it seems to have been a period of growing confidence and stability with certain trends emerging quite clearly as the volume of new lighting has increased.

We must distinguish between the relighting of existing interiors and the lighting of new premises—on the one hand calling for the type of fitting most in keeping with the surroundings, and on the other the use of light and lighting as an integral part of a functional design. We must appreciate also the entirely different lighting requirements between multiple stores and shops specialising in one kind of merchandise.

Relighting almost invariably implies the use of fluorescent tubes in place of an earlier tungsten installation. It is surprising how much shoplighting is still of pre-war origin. Bearing in mind the vast differences of the two light sources in terms of physical size, colour properties, brightness and efficiency, it is hardly to be wondered that the lure of higher illumination values at lower maintenance and running costs has proved deceptively attractive to the unwary. On a strictly economic basis, the introduction of fluorescent lighting will always justify itself, but in so many cases one longs for the return of an installation in keeping with its surroundings and that is not always easy to achieve with an entirely new light source.

The lighting of new shops is a study on its own as now, almost for the first time, it is as much a part of the whole as is the colour scheme or the furnishing of the interior, and the best contemporary installations have shown that tungsten and fluorescent lighting each have a well defined and essential part to play. The fluorescent tubes can add emphasis to the perspective and architectural line of the building, whilst the tungsten lamps, often in partly or entirely recessed fittings, give a contrasting pattern of interest and provide local lighting. It is now appreciated that the two sources are different in every respect, and instead of trying to force them together to the detriment of both, each is being intelligently used within its own limitations. One good example of the wise use of both fluorescent and filament lamps is the recently redecorated Normandie Restaurant at Bentalls of Kingston.

Following on my comments of last year concerning the lighting of shoe shops, I note the effective use of both Natural Daylight fluorescent and filament lamps in a laylight at the premises of the London Shoe Company, Ltd., in New Bond-street, London.

The multiple store requires uniformity from its lighting and a type of installation which is acceptable in all its branches. Uniformity must not mean drabness, however, and the store must appear an interesting place to go into. Here brightness contrast plays as important a part as in the speciality store; the walls as well as the counters must be illuminated to provide definition to an otherwise monotonous area.

The use of the reflector spotlight, related to the fluorescent tube by application if not by pedigree, has now become far more discriminating, in contrast to the Festival of Britain era when, presumably because of its novelty, it had to be employed in every possible way.

Interesting ranges of fittings specially designed for both ratings of reflector spotlight are now available and those produced by Courtney, Pope (Electrical) Ltd. are notable. Of shape and finish primarily designed for the contemporary style of shop-fitting, they set out boldly to be a part of the decorative effect and, unlike their more conventional predecessors, do not require to be decently concealed behind pelmets or above false ceilings.

But are we entirely satisfied with the economics of the internally silvered lamp? I read with interest that neck reflectors are available for use with general lighting service lamps in these fittings. By comparison the reflector lamp is still a very costly item and we are faced with the old problem of sales resistance to an expensive product which needs a far greater demand to reduce its manufacturing cost. Despite the economics there is, however, a growing use undoubtedly due to the superior efficiency and the smaller overall size of the integrated unit. It is of interest to note that the economics have also troubled the Americans who have redesigned their reflector lamp for a 2,000-hour life and are now extending its use and also introducing a wide variety of types.

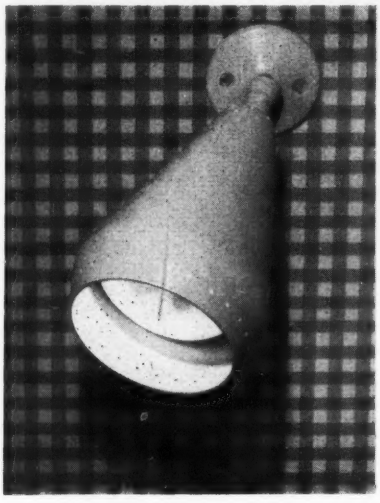
On the subject of emphasis lighting for display purposes, there is also the fitting employing a car headlamp, mains operated through a step-down transformer. By this means an accurately focused beam of very high intensity is obtained, providing the necessary local increase in illumination at the point of interest.

Blended tungsten ballast and fluorescent fittings continue in modest demand and it is somewhat surprising that they have not attracted more attention. Taken over a long period of time the economics are not so attractive as ordinary fluorescent lighting, but compared with an installation using an appreciable amount of tungsten spotlighting as well as fluorescent, the economics are reasonable and there is no denying the attraction of an installation *sans* chokes, capacitors and starters with unity power factor and lightweight fittings. True the tubes get rather a pasting during starting so the life is reduced, but even so there is not a great deal to choose and certainly for a small shop the reduced capital invested is often very welcome.

I note with respect the marketing by the B.T.H. of their Monolux fluorescent fitting, which seems to be very good value for money, incorporating as it does several novel features.

After nearly five years, instant start control gear has begun at last to make headway. Admittedly, shoplighting requirements call for most infrequent switching and in consequence the actual starting performance of the gear is of minor importance compared with its other characteristics. We are becoming increasingly aware of maintenance and labour costs, and must never lose sight of the fact that the fluorescent lamp circuit is a highly complex arrangement for the average electrician to handle. For the price of three starter switches (and ignoring the cost of installing them) the user could fit instant start gear and forget his maintenance—no more welded starter switch contacts overheating the electrodes, and no more deactivated lamps working the starters to death and driving the shop assistants to despair. If shoplighting is rarely switched off it must follow that it is rarely available for servicing, especially in the case of window lighting where displays are semi-permanent. Or is this only a view of the problem

Decorative lighting in the Normandie Restaurant at Bentalls, Kingston.
(*Courtney, Pope* (*Electrical*) *photo*)



A housing for a 75-watt reflector spotlight lamp.
(*Courtney, Pope* (*Electrical*) *photo*)

as seen by the engineer servicing switch-start circuits, who is blissfully ignorant of the complaints that reach the makers of instant start gear? Seriously, though, starters and gear are now so reliable that maintenance costs hardly affect the decision to choose one or the other of the two circuits.

The general requirement of effective earthing has often been raised as an objection to instant start equipment, but I believe, in the case of shoplighting at least, the highest standards of electrical installation should be demanded as a matter of course. Complete bonding to earth may not always be available in domestic wiring, but that is another matter.

Pulse starting is gaining some favour even at the possible slight expense of lamp life. Being in effect a cold start rapidly followed by electrode heating, it may cause some damage to the electrode by ion bombardment, but in general its positive start more than outweighs the resultant decrease in the very long average life normally obtainable from the fluorescent tube of to-day. It will be interesting to follow the fortunes of quick starting equipment; the lamp maker can probably tolerate a condition of operation falling just short of the optimum and perhaps we are at the start of a period of compromise and progress.

A year ago I commented on the increasing awareness of the need for good colour rendering in commercial interiors, and it is evident that at last there is a closer liaison springing up between those who make and those who use fluorescent tubes. It is only a beginning, however, and in general appears to be confined to individual users rather than enjoyed by associations or bodies related to particular trades.

I was recently present at a function when the Trade Press were shown round the laboratories of one of the lamp manufacturers. Less discerning folk might well have been blinded by the science of colorimetric measurement, photometry and controlled life testing, but in one or two cases the visitors' reaction was " so what ? " They felt that technical achievement alone did not in any way help the individual users of this country to find a solution to their own particular lighting and colour problems. Standard practice in the laboratory is not common knowledge in the trade.

We have our committees and societies to consider colour questions, but not all our customers are members, and indeed I venture to think that some members of the I.E.S. could do with some education on the subjects of colour appearance and colour rendition. Nevertheless it is very heartening to read of the trials organised by the L.S.B. for various trade associations in order that members might themselves decide on the best colour for their own shops or factories. Amongst those who have obtained guidance in this way are confectioners, fishmongers, butchers and hairdressers. Probably one of the most interesting features of these tests was to observe the popularity of Colour Matching tubes, used either alone or

preferably when mixed with tungsten; this clearly showing a preference for the right colour, even at a great sacrifice in efficiency. The overall efficiency of a colour matching/tungsten installation can hardly be much over 25 lumens per watt. However, it must be admitted that generally the choice of colour is almost completely haphazard and all the average shopkeeper knows is that he hasn't got the right one! Hence a willingness to try anything new.

In the choice of fluorescent tube colours, much depends on the differing requirements of individual installations, but in every case a clear understanding between the colour appearance and colour rendering properties is absolutely vital. The user's first interest will be in the objective colour of the tube and in this connection it may be that the Colour Matching tube, with its excellent rendering properties, has never been widely used in general store lighting purely on account of its cold appearance.

Having decided upon the lamp most in keeping with its surroundings the next and more discerning stage will be the appreciation of its colour rendering properties on the merchandise, and here far more could be done by the lamp manufacturers in the form of specialist advice, demonstrations and colour trials.

The impression that an increase in the proportion of red light gives better colour rendering is only partially correct, as if this is not accompanied by a similar increase in blue light the effect is merely to overlay the scene with a pinkness which dulls the whites. Furthermore, increasing the red radiation alone leaves the violet line of the mercury spectrum isolated and this gives a magenta rather than a pink overlay and also "violeting" of blue objects. A simple demonstration will convince almost anyone that when the proportions of red and blue are both increased (as can usually be done without noticeable change of the tube's colour appearance) the rendering of red and blue colours is much improved and, most important, whites take on the crisp brightness that is the dream of every washing powder manufacturer.

Lighting by laylight at the premises of the London Shoe Co., Ltd. (*Thorn Electrical Industries photo*)

Flameproof asymmetric fittings in the control room of the Vacuum Oil Company's refinery at Coryton, Essex. (*Holophane photo*)

Industrial Lighting

To-day the emphasis is on quality for industrial lighting both in terms of colour and optical control, and although there is yet much progress to be made I personally believe that 1953 has proved to be a year of especial interest.

I learn that the demand for blended installations of mercury and tungsten lamps is increasing rapidly at present, and the widening range of available fittings bears witness to this. But the demand for such an installation is in reality a demand for improved colour rendering, and once a high wattage discharge lamp with acceptable colour is available the present compromise may well be rejected. The 1,000-watt mercury lamp is probably the largest practical light source as there are few installations which can handle more than an average 50,000 lumens per lighting point until illumination levels go a lot higher, and future effort will be directed primarily towards improving the colour qualities of mercury lamps rather than extending the range to lamps of even greater light output.

The new 80- and 125-watt colour corrected lamps are proving deservedly popular; their good colour-rendering properties, and appearance similar to the Natural fluorescent tube, are likely to be quite adequate for normal industrial requirements. The phosphors used in

these lamps require short-wave ultra-violet radiation from the quartz discharge for complete activation, and extension of the existing range of lamps depends partly on the development of new quartz discharge inners between the existing ratings of 125 and 1,000 watts. The phosphors operate satisfactorily over a comparatively narrow range of temperatures, and thus there are conflicting requirements for outer bulb size—to be small enough for effective optical control (bearing in mind that the entire bulb is flashed with the new type of lamp) and yet to be large enough to prevent excessive heating of the phosphor.

Having achieved the right colour at the right wattages, I believe the mercury lamp will stand supreme for the type of installation which uses blended fittings at present. But I hear the critic asking, "What of emergency lighting? A brief interruption in your supply will extinguish all your lamps, and they won't strike again until they have cooled down." There are, of course, places where a lighting failure would be catastrophic, and in such places there is always a need for an alternative emergency lighting system. But for the generality of cases experience with mercury lighting over 20 years has shown that sudden blackouts are very rarely catastrophic. Nevertheless, some tungsten lighting to lessen the blackout period can always be regarded as a worth-while insurance.

With increasing illumination levels, much attention is also being paid to the quality of the installation. For many years industrial dispersive reflectors have been designed with a cut-off 20 deg. below the horizontal, but Benjamin has recently introduced a range of Deep Bowl Reflectors for tungsten lamps with a cut-off of 30 deg. By thus providing a greater freedom from direct glare, this type of fitting makes possible the use of higher wattage lamps at low mounting height, and must be regarded as a significant newcomer to the lighting field.

The importance of a component of upward lighting in industrial interiors is well established, although the means of obtaining it are often at variance with the designing of a dustproof fitting, and it is felt by some who are not lighting engineers that the type of roof structure usually to be found in workshops and factories is best left unlit! Let us then, as lighting engineers, turn darkness into light in these satanic mills and lead the way to a properly decorated interior in the widest sense of the word.

The Convector Mobilux fitting recently introduced by Benjamin, illustrates one approach to the provision of upward lighting. The vitreous enamelled reflector is suspended from the canopy and lampholder by means of a die-cast alloy spider which permits the flow of convection currents to assist in keeping the reflector surfaces clean, especially when the fittings are in use for long periods of time. For many years we have thought of entirely enclosed dustproof fittings as the best solution to the serious problems of maintenance, but the practical realisation of this when using high-wattage lamps in heavily dust-laden atmospheres is a task of no mean order, and the "stay clean" type of canopy is uncommonly successful.

A new contribution to totally enclosed industrial units, also by Benjamin, is the plastic visor cover for tungsten and fluorescent fittings. The food industry requires at all cost to avoid the danger of broken glass falling on

to production runs from lighting fittings, and the earlier glass visors—and the lamps themselves—were a source of constant anxiety.

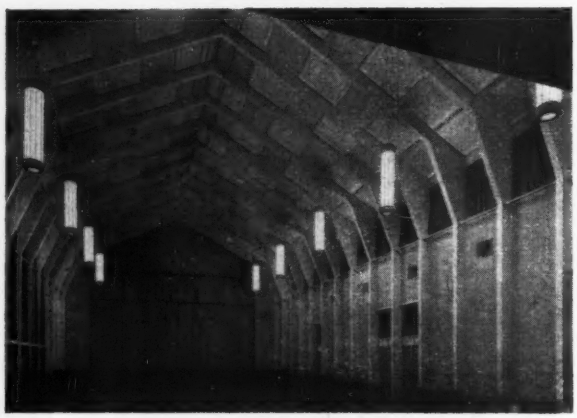
Mercury lamps with internal reflectors are now available in the United States, and I think they may bring about great changes in this country. As a complete light source—and bearing in mind the very long life in service of mercury lamps—we may well justify an expendable unit having, say, a five-year life with no requirements of intermediate relamping and virtually no cleaning. Under these conditions, the higher cost of the lamp itself would be offset by the saving of fittings cost.

Despite new developments there are yet to be seen throughout the ranges of industrial fittings welcome signs of standardisation. The same basic fitting can often be used with tungsten lamps of several wattages and also with mercury lamps, minor changes of lampholder and mounting position being the only modifications required.

A new example of the successful use of Holophane Asymmetric fittings is to be found in the control room of the Vacuum Oil Company's new refinery at Coryton, Essex. The fittings, as can be seen from the photograph, are artistically and technically sound and put the light where it is needed without any apparent effort. Looking at the fittings one is not aware that they are anything other than simple flush mounted units. Quite apart from everything else these fittings are flameproof.

Mention must also be made of the sumptuous new engineering and research laboratory of Benjamin Electric which is now fully operative. Thorn Electrical Industries have also recently opened new laboratories, and it is heartening to realise that more money is being spent in this country to-day than ever before on research and development—which is just as well in view of the activities of our overseas competitors. In fundamental research we have never had cause for shame nor in the design of lighting equipment for use at home, but of the technical problems to be overcome in our overseas markets we have still a lot to learn, and it is good to think that fittings can now be tested under every climatic condition. Some of the problems were described by Mr. Proctor in his article in *Light and Lighting* last June.

A baby mirror spotlight for theatre use.
(Strand Electric photo)

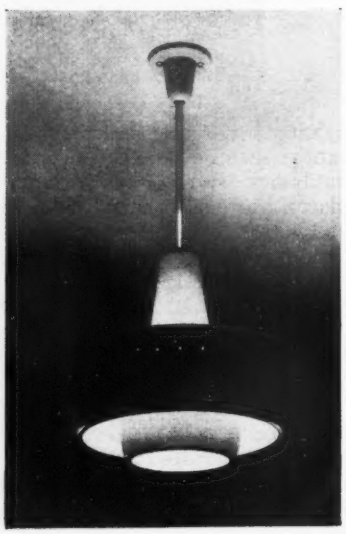


The Assembly Hall at Hatfield College, Essex.
(Thorn Electrical Industries photo)

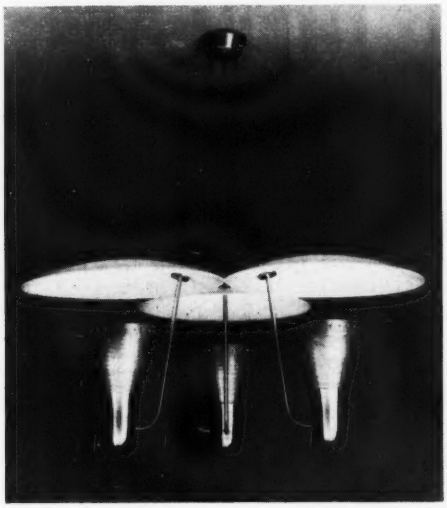
Radio Interference

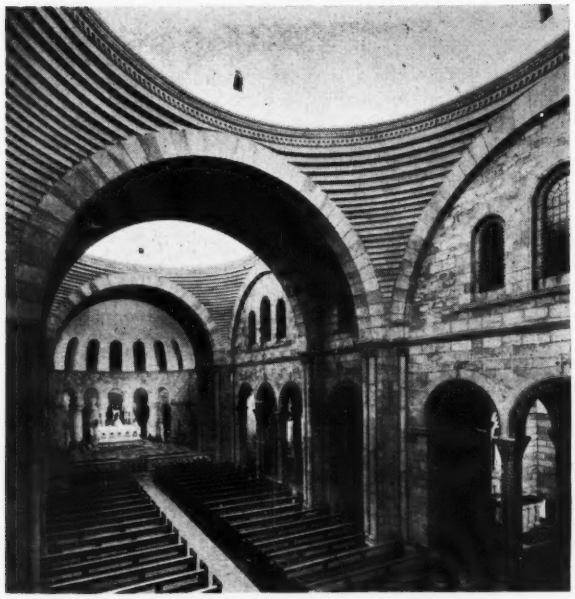
A little learning is a dangerous thing, and recently there has been some careless talk about the allegedly serious interference with radio and television reception caused by electric lamps. Before admitting their liability (or pleading for a lost cause, as the case may be) I note with smug delight that the prime source of radio interference is the love-child of the radio industry itself—the television receiver and the heterodyne whistle from its timebase. The solution is obvious, of course. When every household has a television set and sits watching it every night (with the lights out) there will be no more complaints that the radio receiver is being interfered with—it won't even be switched on! Lagging well behind comes the fluorescent tube—complaints of interference from this source being but one-fifth of those from the television timebase. The Post Office returns list the number of complainants and not the actual sources of trouble, and it may well be that the actual number of offending sources is very small indeed and but a trivial fraction of the complaints recorded.

Electronically speaking, the fluorescent tube with its



The "Orion" interior lighting fitting.
(Falk, Stadelmann photo)





(Above) Cold cathode lighting in the vehicle subway at London Airport. *(Courtney, Pope (Electrical) photo)*
(Left) The "Pegasus" fitting. *(Falk, Stadelmann photo)*
(Below) St. Oswald's Church, Ashton-in-Makerfield. *(G.E.C. photo)*

low pressure discharge and coated electrodes is always a potential source of trouble, but with improved methods of manufacture the vast majority of lamps are well below the B.S.I. permitted level of interference (irrespective of the fact that suppression capacitors are invariably used with the control gear as an additional safeguard). For the same technical reasons the sodium lamp could also be regarded with suspicion, but here again the substantial improvements in lamp quality have resulted in virtual freedom from oscillation, and the symmetric transformer (introduced originally by Philips in Eindhoven in 1936) will provide suppression for all but the worst offenders by balancing out the radio frequency voltages which were fed back along the mains by the earlier asymmetric design.

The practice of scanning the G.P.O. returns on interference is enjoyed by many, and it appears that the Ministry of Transport, having noted that discharge lamps interfered to " some considerable extent " with both radio *and television* (my italics) reception, wrote to the A.P.L.E. expressing the hope that adequate suppression precautions would be observed in new streetlighting installations. We are at present awaiting publication of the British Standards Code of Practice on Radio Interference, but I feel, in anticipation, that the Ministry is hardly being fair in suggesting any new action. For some years symmetric transformers have been installed as a matter of course with sodium streetlighting and the Ministerial inference is accordingly out of date.

The fitting of capacitors across and close to the lampholder terminals in mercury lanterns is hardly necessary, as interference from a high-pressure discharge is merely a freak phenomenon, and the few complaints (only one hundredth part of those from television timebases) are chiefly due to loose contacts or faulty circuitry giving rise to arcing. And the price of freedom from this trouble?—a capacitor costing perhaps £3, to withstand the high ambient temperatures, fitted in every lantern which in many cases would need re-designing to accommodate the extra item.

Television interference is seldom generated by discharge lamps, which confine their attentions to the medium and long broadcast wavebands. But certain vacuum filament lamps, particularly those with more complex filament structures such as the Rough Service types, are able to do so. The oscillations are probably electronic in origin, but their cause is not at all well understood. Gasfilled lamps seem to be entirely free from this trouble.

Certain methods of suppressing this television interference are effective, but hardly practical and the ideal solution is to operate the set well away from any suspect Rough Service lamp, and indeed there seems no reason why television receivers and Rough Service lamps should be close together. It is interesting to note that a large proportion of the complaints come from the south-west area of England, where the local television transmission

coincides with the most usual frequency of vacuum lamp interference at about 65 megacycles per second. In any place where the signal strength is low complaints are naturally more frequent.

Abbey Coronation Lighting

Without question the lighting installation for the Coronation ceremony in Westminster Abbey was the most outstanding of the year, fulfilling as it did requirements of the most diverse and exacting nature.

Primarily it had to be in keeping with the dignity of the Abbey interior while providing illumination levels and lighting effects normally associated with cinema or television studios. An illumination level of 120 ft.c. was provided over the entire theatre area. It was of great importance to ensure that heavy shadows were not cast on the faces of those wearing coronets and, bearing in mind that the main sources of light were specially designed projector units mounted at triforium level some 60 feet up, the photograph on page 13 shows how brilliantly the problem was solved. The main lighting was supplemented by the Abbey's six-light chandeliers, many of which were inverted, fitted with gold-tinted glass prismatic reflectors and equipped with 500-watt photoflood lamps operated on dimmers in place of the normal 100- or 150-watt general lighting service types. The total loading of the installation was some 210 kilowatts.

The gold carpet also provided a most useful component of upward reflected light and the resultant delicacy of modelling of the principals' faces was above reproach.

The entire installation was designed by Holophane to provide variations in lighting effect as the ceremony progressed and many of the floodlights were so placed and focused as to add emphasis to one particular phase of the service.

I cannot do better than quote Dr. Ward Harrison's reference to this installation during the course of a lecture to the I.E.S. He said that he had not yet seen any indoor illumination to equal the lighting in Westminster Abbey for the Coronation and "for that installation and for the genius of those who made it possible, my admiration is unbounded."

Miscellaneous

Theatre lighting is perhaps more in the hands of the artist than the engineer and there I shall leave it. I would, however, mention a rather nice baby spot that Strand Electric have produced; this is designed to take either a 250- or 500-watt lamp and can be fitted with masks and colour filters when necessary. Careful design and mass production techniques have enabled this lantern to be marketed at a most reasonable price.

As a good example of fittings specially designed to suit an interior I would mention the lighting of the Assembly Hall at Hatfield College. The fittings were designed by the architect and produced by Thorn Electrical Industries. Each fitting houses four 5-ft. 80-watt Warm White, and four 5-ft. 80-watt Daylight fluorescent tubes, together with their quick-start control gear, and there is also a 100-volt 100-watt filament lamp in each fitting for emergency lighting. The installation provides about 15 ft.c. at floor level.

School lighting has been spotlighted this year by the issue of a British Standard Code of Practice. Further limitation of brightness contrasts is recommended and it is good to see that someone is taking glare seriously. We all abhor glare in large quantities but are hopelessly uncritical of it in small quantities. Current practice with opal globes just complies with the recommendations of the Code of Practice, but such fittings as the "Orion," produced by Falk Stadelmann, are likely to become increasingly popular for school lighting. Nearly all of us have a soft spot in our hearts for children, but let us hope that one day the standards of lighting which we are now prepared to advocate for schools will be enjoyed by grown-ups in their homes and offices.

The dimming of fluorescent tubes often crops up and was the subject of an interesting paper to the I.E.S. by Dr. Ballin and Mr. Vine recently, but it is unfortunate that the attitude of the theatrical profession still remains cold. Mr. Applebee pointed out that a producer is hardly concerned with lamp efficiency at all; in fact he is only concerned with the lighting effect and is not in the least bit sympathetic to the enthusiastic theatre engineer who assures him that he can do the job nearly as well with a quarter of the watts. There are applications for dimming in ballrooms and elsewhere, especially out of doors, and it is to be hoped that more seaside towns will adopt this method of bringing animation into their efforts to attract visitors. The relatively small thyratron-type unit produced by the G.E.C. is one of undoubted quality and can control up to thirty-two 5-ft. 80-watt hot cathode fluorescent tubes or an equivalent mixed load of hot cathode tubes, cold cathode tubes and filament lamps. Control is smooth over a very wide range of light output and comparatively little special circuitry is required. The unit is, however, not a cheap one and will only be of interest to those who want a really first-class job.

A noteworthy example of tunnel lighting is to be found in the vehicle subway at London Airport, which was opened recently. The light sources are cold cathode fluorescent tubes and the installation was by Courtney, Pope (Electrical), Ltd.

An interesting example of church lighting is the relighting of St. Oswald's Church at Ashton-in-Makerfield, the nave being lighted indirectly via two 32-ft. diameter domes by cold cathode fluorescent tubes while the side chapels are lighted by vertically mounted 4-ft. 40-watt Natural hot cathode tubes in the flutes of the columns. The sanctuary, to contrast with the nave, is lighted with incandescent filament lamps in concealed floodlighting fittings.

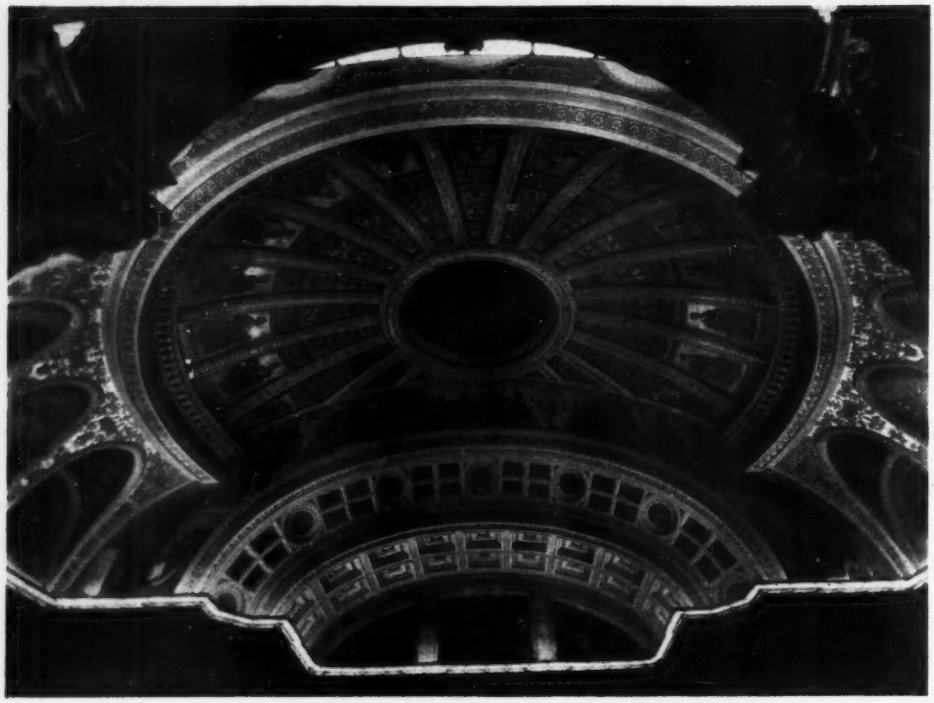
In writing about special installations I am once again reminded that lighting and the design of lighting equipment is a blend of art and common sense combined with a little technical knowledge. Let us not be too proud to seek and accept the advice of those who are best qualified to help us with the art and the common sense.

A last word of praise for Mr. Barnicot, of Falk Stadelmann, who is to be congratulated on his "Pegasus" fitting. It is of a most artistic design and was selected for display in the British Pavilion at the recent Rhodes' Centenary Exhibition in Bulawayo.

Well, as they say, that's that for this year. Let me end by saying that every lighting engineer should write a Random Review. It is a most interesting and instructive pastime, and taking an interest in what the other fellow is doing and thinking gets one out of the groove, if one is in it.

Lighting Installation

McEwan Hall, Edinburgh



The McEwan Hall, Edinburgh, built in 1890, is used for graduation ceremonies, concerts and other functions connected with the University. It has recently been restored to its original condition and new lighting installed. One of the purposes of the new lighting is to reveal the richly decorated ceilings. The hall is 100 ft. wide and approximately 100 ft. high; the luminaires are mounted at 60 ft. The installation consists of a cornice of straight and angled steel frames, glazed and carrying four runs of cold cathode lamps (1,200 ft.). The upper gallery (see illustration on right) is lighted by means of 14 trough reflectors, each containing three 75-watt tungsten lamps and mounted on the capitals of the columns; the lower gallery has 14 indirect spun reflectors, each with three 75-watt lamps and mounted on the columns. In all cases the lighting of the ceilings has been most effective.

The idea of lighting the hall in this way originated from Mr. J. Hamilton, Master of Works at Edinburgh University, who also supervised the installation. The equipment was supplied by George Forrest and Son, Ltd.

Exterior Lighting in Italy

A description of one or two lighting installations typical of exterior lighting developments in Italy.

By VIRGILIO BENZIO*

It is not possible in a short article to examine in detail the progress which has been made in Italy during the last few years in the field of exterior lighting. The following is therefore a description of one or two recent installations which may be taken as typical of the kind of work which is now being done.

Street Lighting

In common with England and other countries of Europe some progress has been made in the use of fluorescent street lighting and experimental and permanent installations have been erected. One of the most original and successful installations is without doubt that which was erected in 1950 in a broad avenue at Montecatini Terme, a fashionable spa near Florence. The problem to be solved in this particular case was a difficult one, though one which has no doubt been faced in other installations to a greater or lesser degree. In addition to achieving a certain level of illumination and a certain degree of uniformity the locality demanded that the effect of the lighting installation should be both stimulating and aesthetically decorous. The Viale Verdi, as this avenue is called, is not only an important main road carrying considerable vehicular traffic, but it is also a favourite promenade of the large number of visitors who during the season attend the baths. The problem is further complicated by the avenues of low spreading trees on each side of the road (see Fig. 1) which would effectively screen the pavements from any high-mounted lanterns.

These problems were solved by using a special small column (see Fig. 2) of particularly pleasing appearance which, in spite of the low mounting height, gives rise to hardly any glare. These columns, which are made entirely of metal, are 3.5 metres (10 ft.) high and 25 cm. (about 10 in.) square. They are fitted at the top with sliding glass panels which are easily removable and which cover three or four 80-watt warm-white fluorescent lamps. The lamps are mounted on special supports designed to permit easy replacement. A system of louvres is incorporated in the column to ensure adequate air circulation to prevent excessive temperatures or condensation. The lower part of the column houses the control gear.

The supply of electricity for the street lighting is by three-core lead-sheathed cables plus neutral; as traces of corrosive agents were found in the soil the precaution was taken of laying the cables in tar-filled channels. The conductor sections have been calculated on the generous side so that the voltage drop at the farthest point even on

* Compagnia Generale di Elettricita, Milan.

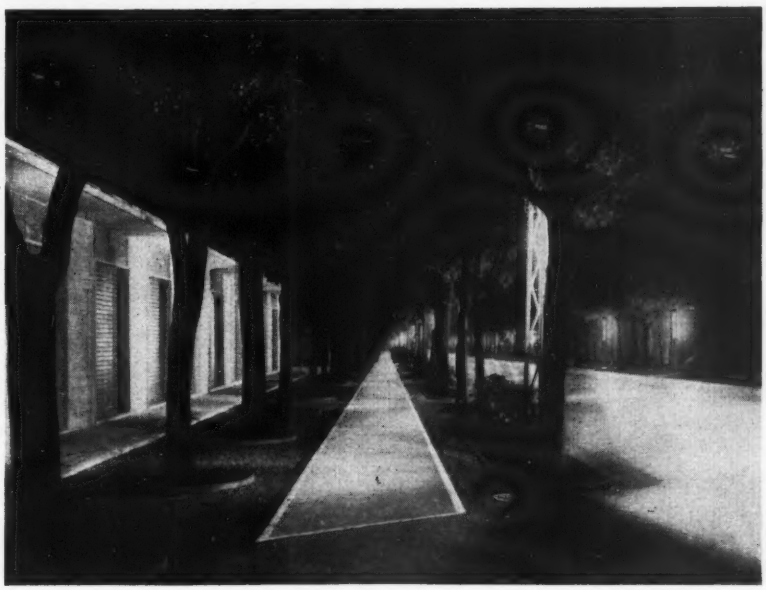


Fig. 1. *Fluorescent lighting of the main avenue at Montecatini Terme, near Florence.*

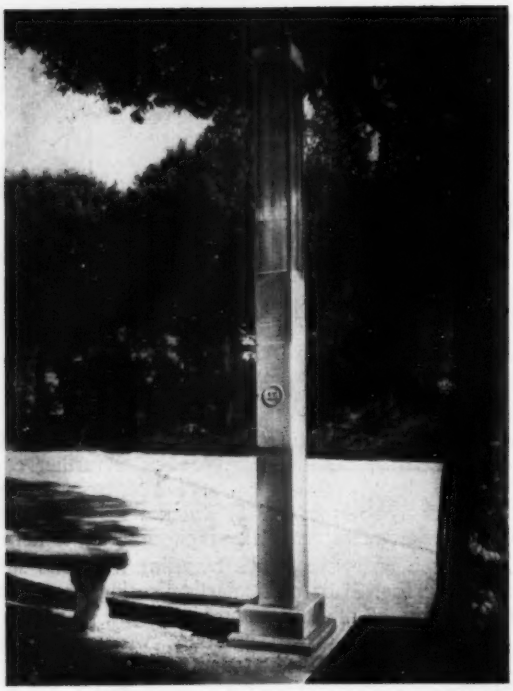


Fig. 2. View of one of the columns in the Viale Verdi at Montecatini Terme.

full load is less than 3 per cent. Distribution is balanced evenly over the three phases.

To avoid an excessive number of junctions which, even when made in the most efficient manner, may represent so many weak points, and to facilitate the detection of any faults and the cutting out of damaged sections, the supply cable has been sectioned inside each column by making two terminals and carrying the conductors to a double 4-pole terminal box mounted on a panel.

Two cables are laid on each side of the road, one feeding two-thirds of the lamp, the other the remaining third. Two-thirds of the lanterns may thereby be extinguished at midnight. Each of the three or four lamps in each lantern is separately fused so that it is possible during the off-season period, when the baths are closed and the town is not so busy, to disconnect one or more of the lamps.

The whole installation is controlled automatically from a single switchboard. The lighting up at night, the partial turn-off at midnight, and the total extinction in the morning are controlled by a solar-dial timeswitch which makes automatic adjustment to follow time of sunset and sunrise. In addition as it is wished to vary the lighting according to whether the bathing season is on or closed, the switchboard is fitted with special pre-set change switches so that

Fig. 3. Port of Leghorn. One of the steel towers, 35 metres high, equipped with three 3,000-watt filament floodlights and three 1,000-watt mercury floodlights.

it is possible to disconnect any of the four circuits. Each circuit can also be controlled by hand.

In all 76 columns have been installed; 59 in the Viale Verdi itself equipped with three lamps and 17 equipped with four lamps in the Tettuccio Square. The average spacing in the Viale Verdi is about 15 metres (about 50 ft.) while the spacing in the square is rather greater.

Part of the Viale Verdi leading up to the section described above is lighted by centrally suspended Infranor fittings using 300-watt tungsten lamps. The fittings are of the cut-off type, which is becoming increasingly popular in Italy.

Fig. 4. Close-up view of the top of one of the lighting towers at Leghorn.

The Lighting of Large Areas

The lighting of large outside areas by projectors is being widely adopted on account of the practicability of the system and its economy; by concentrating the light sources at a few points the maintenance and control of the apparatus are greatly facilitated. In addition, fewer cables and supports are needed and the use of higher efficiency lamps is possible. Operating costs are therefore much less than with other systems. The use of high powered projectors also makes the installation more flexible, allowing the concentration of light at particular places as required, though, of course, reducing the amount of light at other places which are presumably not so important at that particular time.

The light sources should be of the highest power possible, naturally restricted, for obvious reasons of reliability and convenience, to standardised types found on the market. Surveying the types of sources having such characteristics, it appears evident that the range of selection is confined to incandescent, mercury-vapour and arc lamps; sodium-vapour lamps, although advantageous for analogous applications (lighting of depots, night traffic, enclosures, etc.) especially by reason of their high efficiency, are not suitable for this particular application owing to their low power and low brightness, apart naturally from any consideration as regards their particularly unpleasant colour.

Similarly, arc lamps cannot be considered owing to the excessive maintenance needed for replacing the carbons

Fig. 5. Race track at Agnano (Naples). View of pole with 1,500-watt floodlights. On the stand a 3,000-watt Infranor floodlight.

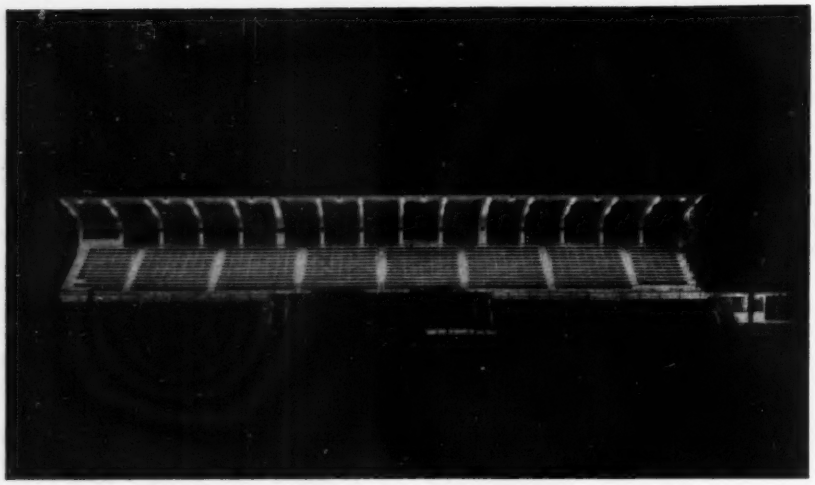


Fig. 6. The grandstands at the Agnano racecourse lit by fluorescent lamps.

and continuous checking of the delicate regulating mechanisms. The field is therefore restricted to incandescent and mercury-vapour lamps, both of which offer advantages and characteristics that may be said to be complementary.

In fact, if the mercury-vapour lamps have a higher efficiency, a longer life and a lower heat dissipation, on the other hand filament lamps are simpler and cheaper, require no control gear, give a more acceptable colour and a greater brightness, the last mentioned being the characteristic which permits very accurate control of the beam—a most important consideration.

The lighting installation at the Port of Leghorn was studied on the basis of the above-mentioned concepts, taking into account also the particular local requirements. It comprises in all four batteries of projectors, three of which are mounted on single stem tubular masts at a height of 35 metres (about 115 ft.) from the ground, and one installed on the sylos at approximately the same height. This considerable height, besides eliminating almost entirely any direct glare, avoids the production of marked shadows and permits the attainment of high illumination values even at a great distance, thus producing better uniformity of distribution.

Each battery (see Figs. 3 and 4) comprises two types of projectors: Infranor projectors equipped with 3,000-watt incandescent lamps and other projectors equipped with 1,000-watt mercury-vapour lamps. The adoption of this mixed system takes advantage of the high efficiency and long life of the mercury-vapour lamps for supplying the basic lighting, and makes use of the high intensity narrow beam, which is characteristic to incandescent projectors, for lighting the more distant zones and providing a high illumination where necessary.

The area lighted in this way is about 600,000 sq. metres (about 700,000 sq. yds.); the mean illumination is 1.5 lux (0.15 lm./ft.^{2}) and the minimum illumination even at the outer edge is just over 0.2 lux; the uniformity factor is just over 1 : 10, a value which is really remarkable for installations of this kind. The lighting of the port thus enables the work of loading and unloading vessels and other means of transport to continue at night; when a more intense lighting is required for a particular job it is sufficient to direct one or more of the Infranor projectors in the desired direction. As a rule after midnight the port traffic is negligible so that only sufficient light is needed for control purposes; this is provided by the mercury lamps only with a minimum power consumption. Even so, the average illumination is more than 0.5 lux.

The total installation consists of 12 Infranor projectors and 15 mercury projectors, the total load being 53 kw.

Lighting of Sports Grounds

In all systems for lighting sports grounds the aim is to control the brightness of the objects to be watched and of the background so that the object itself is visible to all onlookers independent of its size, speed, location and direction of travel.

To this end it is necessary to consider the following factors:—

(1) The object to be watched, its size, location, path and co-efficient of reflection.

(2) The field of view, particularly as regards the brightness of objects and their background.

(3) The position of spectators and arbitrators as well as that of the players, whose position, movement and speed must be taken into account.

These factors were all taken into consideration in designing the lighting installation for the trotting and race tracks at the Agnano Racecourse, at Naples. In view of the speed of the objects of regard, i.e., the racehorses, and the distance of them from the spectators, it was necessary to provide a high level of illumination; it was decided that the average illumination on the tracks should be 100 lux (10 lm./ft.^{2}) and 150 lux on the finishing straight; these values refer to the vertical illumination. For economic reasons these values are not as high as those adopted in some other countries, notably in the United States, but they are something new for racecourses in Italy, the majority of which have an average illumination of around 60 lux.

The lighting system (see Fig. 5) consists of single stem tubular steel poles 23 metres (75 ft.) high, on the top of which are mounted batteries of floodlights orientated in the two directions of the track so that the projected beams coming from one pole cross those from the adjacent pole, thereby avoiding heavy shadows on the track. The fittings have specially treated aluminium reflectors and glass covers and are fitted with 1,500-watt tungsten lamps which operate in the vertical position to

ensure longer life. As the fittings are adjustable in both the vertical and horizontal, setting is easy and mounting and maintenance is simplified.

This system of using batteries of fittings is found to be more convenient than having single fittings spread out along the line of the track as the number of wiring points is reduced and maintenance and setting are much easier when the fittings are grouped together.

To avoid obstructing the view of spectators near the finish of the course the poles at this point are erected alongside the grandstand instead of on the edge of the track. This arrangement, however, means that the batteries are located at a greater distance from the track with consequent reduction in illumination. To overcome this some Infranor type projectors using 3,000-watt lamps are installed on the roof of the grandstand. These projectors are adjusted to give a wide angle beam (40 to 70 deg.) in the horizontal, with only a narrow angle (5 to 15 deg.) in the vertical. They give good coverage on the track itself and do not glare in the eyes of the judges who are situated immediately in front of and facing the grandstand.

The complete track installation consists of 35 batteries made up of 550 1,500-watt and five 3,000-watt projectors.

The grandstands themselves (see Fig. 6) are lighted by 96-in. T8 slimline fluorescent lamps fixed to the roof beams and giving an illumination of 60 lux. Fluorescent lighting is also widely used in the various rooms, offices, etc.

Conclusion

The above descriptions of some recent installations will show that in Italy, as elsewhere, efforts are being made by lighting engineers to meet the ever-growing complex requirements of this modern age. The trend is towards higher levels of illumination with installations conceived rationally and not wholly empirically, as they usually were in the past. The use of high efficiency light sources is becoming more common, though their higher efficiencies must be considered together with their aesthetic effect. This latter factor is a most important one in Italy where it often outweighs considerations of a purely technical nature.

Correspondence

Colour-Matching Units

To the Editor, LIGHT AND LIGHTING

Dear Sir,—The article in the October issue entitled "A Colour Matching Unit," by J. Hoffman, has many points of interest as a further application of the high-pressure xenon lamp.

The excellent colour-rendering qualities of the xenon gas arc were referred to in Aldington's announcement of this development (see Trans., I.E.S. Lond., Vol. XIV, No. 2, 1949). For colour photography and colour projection the xenon gas arc gives most excellent colour rendering. Its radiation is closer to daylight than that of any other straight discharge source.

Having said this, however, when one considers the subtleties of the colour-matching process it is doubtful indeed whether the tests on the Disco colour test unit, reported by Hoffman, would be regarded by colourists as at all adequate. An analysis of the spectrum in terms of blue, green and red can hardly be regarded as a method of assessment for a true colour-matching unit. Comparison with the incandescent lamp and the Warm Tone and White fluorescent lamps hardly seems relevant, as these lamps are, of course, quite unsuitable for colour work and certainly have no place in the colour-matching techniques in this country. A more useful comparison would have been with fluorescent lamps designed for colour-matching purposes. This is especially the case when one considers the excellent work done in this country on the development of the Colour-Matching White fluorescent lamp; and of the Siemens Colour-Matching Unit employing a combination of blue fluorescent tubes and incandescent lamps which was fully described in *Light and Lighting*, May, 1949. Both of these have found wide acceptance in this country and elsewhere.

As envisaged by Aldington in his announcement in October, 1947, the xenon gas arc has many potentialities as a light source, but our experience of both xenon and fluorescent lamps suggests that the unit employing the combination of blue fluorescent and incandescent lamps is to be preferred on colour quality alone apart from lamp cost and maintenance.

W. HARRISON.

Siemens' Lamp Research Laboratories, Preston.

Lamp Posts and Landscape

To the Editor, LIGHT AND LIGHTING

Dear Sir,—Your photographs of Burford High Street in the November issue show very clearly that concrete lamp-posts can look wrong if they are put in the wrong place and in the wrong proportion. The photographs, unfortunately, do not show that Burford High Street is, in fact, lit by lanterns on 25-ft. steel poles and that the local authority has made the best of this by painting the poles to tone nicely with the warm colour of the Cotswold stone.

In spite of this, the steel poles are an eyesore to me personally, partly perhaps because I used to receive 1s. annually for a way-leave for a bracket lantern. Although most of the equipment is still attached to the house, an expensive and rather obtrusive pole has now been erected inconveniently close to the building line, carrying the lantern a few feet higher than before.

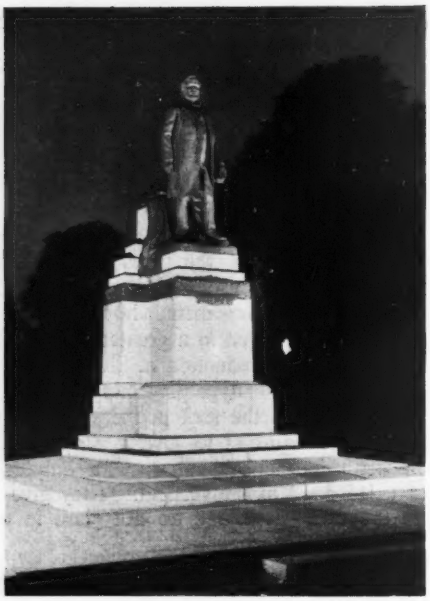
I strongly endorse Mr. Betjeman's plea that the lamp-posts or brackets should suit the architecture and that the Code of Practice should be interpreted somewhat flexibly for the same reason. Several sites in Burford would have been better if brackets had been employed to carry the lanterns, and I sincerely hope that the houses which have already stood for hundreds of years will outlive these lamp-posts.

London. J. G. HOLMES.

An Example of Park Lighting

During the period August 29 to September 5, 1953, the Carnegie Dunfermline Trust held their Jubilee celebrations in honour of that famous philanthropist Andrew Carnegie, who was born in the Royal Burgh and City of Dunfermline. As part of the celebrations the well-known Pittencrieff Park remained open during each evening to enable the public to view the floodlighting of various features.

In the conservatory, the colours of the blooms were enhanced in richness and depth by the application of appropriate coloured tungsten filament lamps in suitable parabolic angle reflectors. In particular, the climbing variety of geraniums appeared brilliant



The Andrew Carnegie Monument

The Formal Gardens

The Palace Ruins

The Glen

when illuminated by a combination of red and flame colour-sprayed filament lamps. Hanging baskets contained small 15-watt pygmy lamps unobtrusively concealed in foliage.

In front of the conservatory, various laid-out flower beds were illuminated individually, care being taken to confine light to each bed with the minimum of spill, the resulting effect in the evening darkness proving most attractive.

The formal gardens are in the form of a square based on a south wall. In the centre of the lawn a fountain springs from a lily pond. In this feature use was made of concealed tungsten filament floodlights and various "cinemoid" colour filters, such as amber, green and red, with green filtered light directed on to the lawn for contrast. The fountain spray was also illuminated by coloured lights from underwater units, giving a pleasing effect among the lilies and rushes.

The Glen

Close to the entrance from the Abbey, where the body of Robert the Bruce lies, a masonry bridge crosses a stream running through the glen. The masonry work was enhanced by the use of sodium vapour discharge lighting, the spill from which bestowed autumn russet tinges to the foliage of nearby trees. Following the stream, fluorescent colour dimming equipment gave a variety of hues to the surrounding foliage, shrubs, rockery and trees by the use of three tube fittings housing combinations of green, white, gold and red tubes.

Other features illuminated were the Palace ruins and the Andrew Carnegie statue, both in sodium vapour discharge. At the ruins the application of blue and red colour filters on tungsten floodlights gave contrast in nearby trees.

Andrew Carnegie's cottage birthplace, situated at the corner of Moodie Street and Priory Lane (outside the park), was illuminated by sodium vapour lamps which gave emphasis to the character of this typical example of Scottish building in the Carnegie era.

Pittencrieff Park presents endless opportunities for floodlighting, and while only a small number of features were illuminated it was felt that those selected proved attractive. These features were chosen by the Carnegie Dunfermline Trust Committee for floodlighting, and the work was executed on their behalf by the South-East Scotland Electricity Board.

The majority of the floodlighting equipment used was drawn from the comprehensive stock held by the South-East Scotland Electricity Board, all of which is available for hire.

Equipment Used

THE ANDREW CARNEGIE MONUMENT

Two "Reading" (Philips Electrical, Ltd.) 140-watt sodium projectors, one at each of two corners of the base.

THE FORMAL GARDEN

Three 150-watt underwater lighting units (G.E.C. Ltd.) with mixed colour filters directed on to the fountain spray; Four 500-watt floodlights (Simplex) with various colour filters to light the south wall;

Two 500-watt wide-angle general purpose floodlights (G.E.C. Ltd.), with green colour filters on the lawn.

THE PALACE RUINS

Fourteen 140-watt (Revo) sodium floodlights;

Two 500-watt (Simplex) floodlights on nearby trees, one with red filter and one with blue filter.

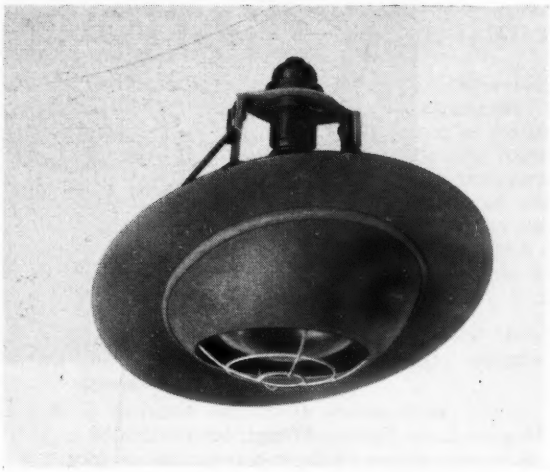
THE GLEN

Two 140-watt (Revo) sodium floodlights on the old masonry arch bridge;

Two sets of colour-dimming equipment (Thorn Electrical Industries, Ltd.), each set controlling eight 3 x 80-watt lamp fittings, using green, yellow, white, gold and red colours directed on to the stream, foliage, trees, etc.

LUMINAIRES

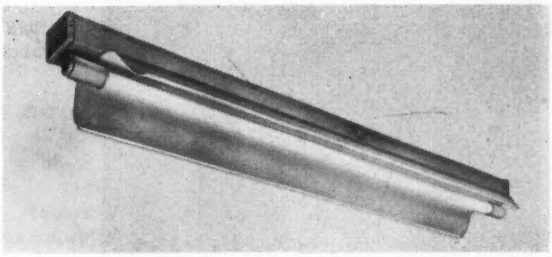
No. 3



A convenient and contemporary unit for recessing a 75-watt spotlight into a false ceiling. Simple in design, the fitting consists of a steel hemisphere with a central aperture behind which the spotlight is mounted. This unit rests on a felt ring supported by a steel "halo" plate which may be flush with the surface of a false ceiling. The lamp unit rests freely yet firmly upon the felt and may be trained in a cone 30 deg. about the vertical axis. The fitting is finished in cream crackle enamel.

Price, £1 12s. 6d.

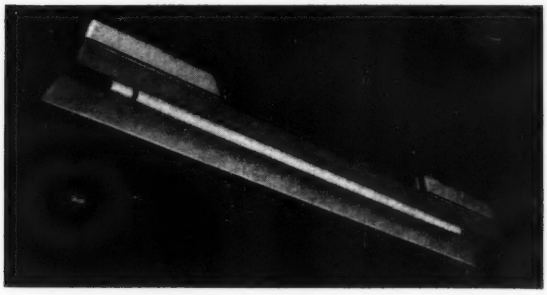
BRITISH THOMSON-HOUSTON, CO., LTD.



One of a new range of industrial fittings. Fixed B.C. lampholders permit instant re-lamping with either hand from either end of the fitting. The "Pendicone" suspension method greatly simplifies installation. The new range consists of standard one- and two-lamp channels fully wired to which a variety of reflectors may be fixed.

Price (as shown), £8 10s. 0d.

BRITISH THOMSON-HOUSTON, CO., LTD.



New moisture-proof fitting for one 5-ft. 80-watt fluorescent tubular lamp designed for use in places where water spray or excessive humidity are encountered such as in flax mills, vehicle-washing plants, paper-making plant, etc. The fitting is designed for chain or conduit suspension and is suitable for either indoor or outdoor use.

METROPOLITAN-VICKERS ELECTRICAL CO., LTD.

A new blended light unit trough of heavy gauge steel with hinged lid secured by clips and robust end plates for suspension, containing chokes as necessary and lampholders, all wired to connecting block. Circular plates fixed to underside for attachment of reflectors. Reflectors for tungsten lamps (except 300 - watt size) of anodised aluminium; reflectors for mercury lamps and 300-tungsten of heavy gauge steel vitreous enamelled. Two sizes of reflectors available; also a three-lamp type.

Price (as shown), £16 5s. 4d.

BENJAMIN ELECTRIC LTD.

Modern home lighting fittings; set consists of a pendant for a sitting- or dining-room, a hall-lantern and a table-lamp for a lounge. Made of simple materials with enamelled wire used as part of the decorative treatment of the whole fitting. Natural coloured pleated parchment shades are used for the pendant and table-lamp. The lantern-cone is made in oiled card with mustard coloured binding. All the wire-work has a white stove enamelled finish. The pendant fitting is 21 *in. overall with* 18 *in. dia. pleated shade. It is wired ready for installation and should be used with a* 100*-watt lamp. The matching table lamp is* 20 *in. high with a* 16 *in. dia. pleated shade. The switch lampholder is wired with* 3 *yd. flexible. The hall-lantern is* 10½ *in. in dia. and* 9½ *in. deep.*

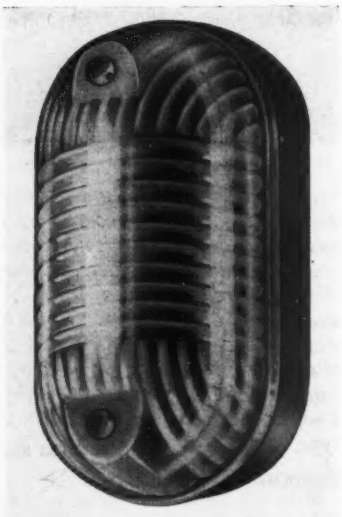
Price, the set...£7 10s. 0d. (P.T....£1 5s. 0d.)
(also available separately).

THE GENERAL ELECTRIC CO., LTD.

A new bulkhead lighting fitting, the "Corrilux," which has been designed to contribute to the lowering of building costs. For tungsten lamps up to 100 *watts; it has a non-fracturing aluminium alloy body of exceptional strength and corrosion resistance. Incorporates weather and dust-proof features; secret key operation prevents tampering. Suitable for surface and semi-recessed fixing, gives general illumination with minimum glare; satin exterior finish, attractive in itself, provides surface for painting on site.*

Price, £1 7s. 0d.

SIMPLEX ELECTRIC CO., LTD.



Lighting Abstracts

OPTICS AND PHOTOMETRY

535.241 : 628.971

1. Design characteristics of a photo-electric brightness meter.

K. FREUND. *Illum. Engng.* **48**, 524-526. (*October*, 1953.)

Describes a self-contained portable direct-reading photo-electric meter capable of measuring brightnesses from 0.1-1,000,000 ft.-lamberts. The meter is held in the hand and is "aimed" by means of a built-in telescope focusing between 5 ft. and infinity. A central area in the eyepiece indicates the part of the field (1½ deg. acceptance angle) whose brightness is being measured. Supplementary lenses enable the instrument to focus down to 2 in., at which distance it is possible to measure the brightness of an area 1-10th-in. in diameter. P. P.

535.241 : 628.971

2. An instrument for the evaluation of night visibility on highways.

A. E. SIMMONS AND D. M. FINCH, *Illum. Engng.*, **48**, 517-523 (*October*, 1953.)

The factors which influence night visibility are tabulated and its measurement by a number of existing visibility meters is critically reviewed. Ideally, a night-visibility meter should maintain the user's adaptation level unchanged and affect only a small central area of his visual field. A meter has been specifically devised to meet these and other requirements, the central portion of the field of view being reduced to contrast threshold by the dual action of adding brightness from a veiling source and reducing the brightness of the scene. The theory of operation of the meter is given and some measurements made in actual streets are discussed. P. P.

535.241

3. Measurement of luminous flux from projectors.

R. G. WEIGEL, *Lichttechnik*, **5**, 296-298 (*September*, 1953.) *In German.*

The luminous intensity of a projector, such as a headlight, can be measured only at a considerable distance, usually some 100 to 150 times the diameter. Thus the distribution curve of luminous intensity cannot be determined in the ordinary laboratory room and so the luminous flux cannot be calculated as in the case of a lighting fitting. It can, however, be found by making illumination measurements at any convenient distance and calculating from these "fictitious" values of luminous intensity. The distribution curve thus obtained will not give a true picture of the luminous intensity, but it will give a true value for the flux, using a graphical method equivalent to the Rousseau diagram. J. W. T. W.

LAMPS AND FITTINGS

621.327.4

4. Mercury high-pressure lamps for blue-printing machines.

J. KERN. *Elektrotechn. Zeits.* (*B*), **5**, 303-305 (*September* 21, 1953). *In German.*

This paper describes the use of the h.p.m.v. lamp for blue-printing. The relative speeds of nine different lamps, ranging from 4,000 to 550 watts, are tabulated with their electrical characteristics and dimensions. The unwanted heat is removed by a current of air between the lamp and the tracing, but cooling of the lamp itself reduces its efficiency and it is therefore protected by a cylinder of glass transparent to u.v. radiation. J. W. T. W.

621.327.43

5. Effect of atmospheric humidity on the striking of fluorescent lamps in starterless circuits.

C. H. STURM. *Elektrotechn. Zeits.* (*B*), **5**, 305-306 (*September* 21, 1953). *In German.*

The effect of humidity on the voltage required for the instant starting of fluorescent lamps is described, and it is shown that the voltage is greatest for an intermediate value of the surface leakage. When the surface resistance between the ends of the lamp is either very high or very low the voltage necessary for striking is greatly reduced. In a lamp with pre-heated electrodes the starting voltage falls as the pre-heating current is increased. J. W. T. W.

621.329

6. Tendencies of the French luminaire.

PAUL FARGETTE. *Int. Ltg. Rev.*, 1952/53. No. **4**, pp. 7-11.

This article reviews the main tendencies in French decorative lighting fittings. The effect of French individualism and prevailing artistic tendencies are discussed in relation to the imperatives of adequate illumination, glare control and low-cost production. Brief reference is made to fluorescent lighting and to its relatively small impact on decorative lighting in France. There are 11 illustrations covering a variety of new French wall and ceiling fittings and table and floor standard lamps. W. R.

621.327.43 : 535.37

7. Recent progress in the utilisation of the phenomena of luminescence.

M. P. DELRIEU. *Bull. Soc. Franç. Elect.* (*Sér.* 7) **3**, 596-613. (*October*, 1953). *In French.*

Describes recent progress in the development of fluorescent H.P.M.V. lamps, giving the characteristics of the magnesium fluogermanate and barium-strontium-lithium silicate powders; construction and characteristics of lamps; lighting equipment developed to use them, and examples of their application. J. M. W.

LIGHTING

628.93

8. Calculation of direct illumination from linear light sources.

K. WILD. *Lichttechnik*. **5**, 298-300 (*September*, 1953). *In German.*

The author derives the formula for the illumination produced by a line source at any point on a plane at a given distance below it, assuming that the polar curve for the source in any plane containing its axis is a circle tangential to this axis. He gives a diagram to facilitate the calculation and a worked example to illustrate the method which is analogous to that referred to and used by P. M. Excell (*Light and Lighting*, **46**, 341, 1953). J. W. T. W.

628.97

9. Artificial light for plant cultivation.

F. TANNER. *Elektrotechn. Zeits.* (*B*), **5**, 299-302 (*September* 21, 1953). *In German.*

The use of artificial light in intensive culture is now receiving attention in Germany. The author favours the use of the h.p.m.v. lamp or the h.p.m.v. fluorescent lamp for the purpose and he describes some installations and the results obtained. Details of the costs are included The final section of the paper describes the effect of tubular fluorescent lighting on the germination of stored seed potatoes. J. W. T. W.

REVIEWS OF BOOKS

"The M.K.S. System of Units." By T. McGreevy. Pp. 283 + *xii; Figs.* 65. *Pitman,* 21*s. net.*

The introduction of the rationalised M.K.S. (metre-kilogramme-second) system of units has now received official sanction, both internationally by the International Electrotechnical Commission and nationally by the Institution of Electrical Engineers. The latter body has decided that in all its publications quantities shall be expressed in the units of this system (although for the present authors of papers may, if they wish, use as well the units to which they are accustomed). It is therefore most important that electrical engineers, and especially students, shall become familiar with the new system, which undoubtedly possesses many practical advantages. The author of the present book has made a most useful contribution towards achieving this result, and everyone, not least teachers in technical colleges, will be correspondingly grateful to him. His approach is essentially practical, and after a thorough and very clear explanation of the M.K.S. system he goes on to show how it may be most profitably introduced in the electrical engineering training of the part-time student and the full-time student. He has made here a most useful distinction, based largely on the differing mathematical equipment and scientific knowledge of the two types of student, and the lines of approach he suggests are clearly the outcome of his experience as a teacher.

In spite of the fact that the subject lends itself extremely readily to the intrusion of misprints and errors in formulae, etc., the book seems remarkably clear of these —a tribute to the care of author, printer and proof-reader alike. The book is very well produced and there are a good index and a number of most useful diagrams and tables. Every engineer (not only electrical) who does not feel that he is already thoroughly familiar with the M.K.S. system should obtain a copy and study it carefully, or he may soon find himself at sea in the literature of his subject. J. W. T. W.

"Neon Signs and Cold Cathode Lighting." By Samuel C. Miller. Pp. 383, *figs., index. McGraw-Hill Book Co., Inc. Price* $6.00.

This is the second edition of a book which covers very comprehensively the manufacture, installation and maintenance of Neon signs. It is written essentially with the practical aspect in view and should be particularly useful to those proposing to enter the Neon manufacturing business, or to others with limited experience who wish to increase the quality and speed of production.

The author discusses in considerable detail workshop practice and describes at length glass bending and pumping operations. This edition also includes a small section on cold cathode lighting and illumination calculations, together with a step-by-step procedure for designing a cold cathode lighting system. Many of the practical difficulties which arise in the Neon-sign business are considered, but in some instances the solutions suggested are incomplete. For example, much space is devoted to the elimination of radio and television interference, and while a combination of chokes and capacitors is suggested, no indication of their value is given.

Frequent references are made to American practice, which conflicts in some degree with that in the United Kingdom, and the reader will be advised to acquaint himself with the appropriate British Standards and I.E.E. Regulations for the Electrical Equipment of Buildings. C. D. B.

"Colour and Light at Work." By Robert F. Wilson. Pp. 142; *figs.; index. Seven Oaks Press, Ltd. Price* 25*s.*

In the foreword Sir Charles Mole, H.M. Director-General of Works, says: "Colour can create an illusion of space and light, and better environment can lead directly to greater production and reduce labour troubles and thus to higher industrial efficiency." That every place of work should be as pleasant as modern decoration and lighting can make it is an ideal that should be achieved without delay.

This book, the first of its kind to be published in this country, is specially written to interest executives and those concerned with human welfare. Based on the personal experiences and theories of the author, the principles of colour and, in a practical way, the physiological and psychological reactions of users are introduced so that the book has also a general appeal.

One chapter deals very generally with lighting, and the author insists in several places that it is useless to prepare a colour scheme without full knowledge of the lighting to be used and experience of the effect lighting will have on colours.

The early chapters deal with the fundamentals of colour and reasons why colour is important in industry. Emphasis is given to the importance of juxtaposition of colours, but the effect of intensity of lighting is not mentioned. The author's theories relating to after-images is the basis of his colour circle.

Chapters 5, 6 and 7 contain many useful hints, but a little more detail, accompanied by a greater number of colour plates of interiors, would have been helpful and would have shown something of the progress made in this country. E. B. S.

"Symposium on Fatigue." Edited by W. F. Floyd and A. T. Welford. Pp. 196. *H. K. Lewis and Co., Ltd.* (1953). *Price* 24*s.*

Fatigue is one of the most familiar of all experiences —and yet it is the most difficult to define, but this book assists in no small measure in showing fatigue in its true perspective. The book consists of a number of contributions by eminent scientists, physiologists, psychologists, engineers, etc., dealing with the complex and many-sided problem of fatigue that were originally given at a Symposium held by the Ergonomics Research Society in March, 1952.

Among the many valuable papers included is the one on "Visual Fatigue with Special Reference to Lighting," by H. C. Weston, which readers of this journal will recall was presented at a meeting of the Illuminating Engineering Society in December, 1952. Another contribution that deals with the effect of illumination on fatigue is that by T. A. Ryan, of Cornell University, who describes attempts to correlate muscle reactions to levels of illumination. Altogether a wealth of valuable information on the subject of fatigue. E. J. W.

Trade Literature

BENJAMIN ELECTRIC, LTD.—Illustrated leaflet on plant irradiation as an important development in tomato growing.

BRITISH THOMSON-HOUSTON, CO., LTD.—Pocket edition catalogue of lighting equipment giving full details and prices with illustrations.

CRYSELCO, LTD.—Illustrated brochure of commercial fittings with price list; including information on lighting for churches and hospitals. Also a brochure on industrial lighting fittings giving illustrations, details and prices of industrial reflectors.

DORMAN & SMITH, LTD.—List MCB/5—a new publication containing details of latest developments in the field of miniature circuit breakers with illustrations and prices.

EKCO-ENSIGN ELECTRIC, LTD.—Well illustrated pocket lighting catalogue containing details of industrial, commercial, decorative and shop window fittings together with fluorescent, tungsten filament lamps, etc. Separate price list enclosed.

GENERAL ELECTRIC, CO., LTD.—Two catalogues, part 1 dealing with Osram lamps and tubes and part 2 with Osram bulbs, battery type. Both these catalogues contain useful illustrations and information together with prices. Also a booklet entitled "Street Lighting" containing diagrams and photographs, some in colour, which illustrate fully the points made about mercury, sodium, fluorescent and tungsten lighting both in this country and overseas.

HARRIS & SHELDON.—Revised price list of fluorescent lighting fittings containing illustrations of a wide range of high-class lighting equipment.

H. C. HISCOCK, LTD.—An illustrated folder of new lights sculptured in wire with "Ribbon-Ray" shades. This range is made on the principles of the Swedish designer B. J. Gullberg. Price list included.

OSWALD HOLLMAN.—Catalogue showing a large variety of recently designed lighting fittings and shades.

HOLOPHANE, LTD.—Coronation Souvenir Booklet showing the exacting task involved in lighting the interior of Westminster Abbey. This also gives a short background history of the Abbey and the Coronation and includes photographs of the actual ceremony .

LINOLITE, LTD.—Price list giving details and prices of current products including reflectors, decorative and fluorescent fittings, signs and lamp prices.

METROPOLITAN-VICKERS ELECTRICAL CO., LTD.—Lamp catalogue giving details and illustrations of Metrovick products including fluorescent, spotlight reflector, headlight, miners, mercury, sodium and projector lamps with prices.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.—New illustrated broadsheet and price list describing full range of Sieray fluorescent lighting fittings which forms a useful wall chart for reference. Also similar broadsheets describing complete ranges of commercial lighting fittings and industrial lighting fittings. A further descriptive folder on the continuous lighting trunking system for fluorescent lighting installations and telephone and power cables; also a leaflet comprehensively describing floodlight fittings for buildings, parks and goods-yards and another on planned shop lighting.

SMART AND BROWN (ENGINEERS), LTD.—A leaflet illustrating and giving prices on control gears. Also two leaflets on fluorescent lighting and one on the "Maxilite" fittings, both well illustrated and containing prices.

STELLA LAMP CO., LTD.—A new catalogue describing a wide range of lamps containing useful diagrams and information together with prices.

UNION LAMP AND LIGHTING CO., LTD.—An illustrated brochure describing fluorescent lamps and fittings for domestic, industrial and architectural use.

Street Lighting in South-East Scotland

Our attention has been drawn to an error in the article on the above which appeared in our November issue. In the table on p. 431 the main contractors for both the street lighting schemes carried out for the Kelso Town Council were James Kilpatrick and Son, Ltd., and not as shown in the table.

Binders

Binders for *Light and Lighting* (old size) are available for those who wish to retain the last and earlier volumes. The price is 6s. 6d. per binder.

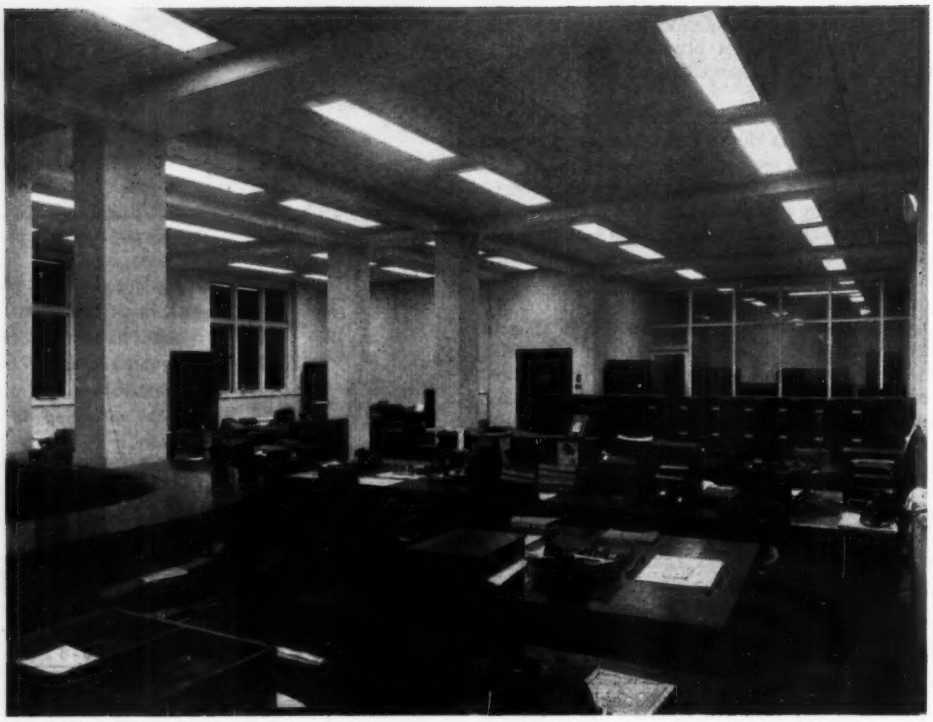
SITUATIONS VACANT

Applications are invited by The General Electric Co., Ltd., to fill vacancies in their FITTINGS DESIGN office. Attractive salary and prospects for men with initiative. Initial applications should give as much information as possible of experience and qualifications. Apply in writing to Staff Department, Magnet House, Kingsway, London, W.C.2.

LIGHTING ENGINEER required to operate in Midlands and North. Must be qualified and have varied practical industrial lighting experience. Essential—able to prepare complete lighting scheme from own survey. Please give details of age, training and qualifications and indication of salary range received. Own I.E. staff notified. Reply Box No. 857.

Lighting Installation

A City Banking Hall



This space was recently taken over for use as a banking hall and the interior was completely redesigned and modernised. A Cullum "Acousti-Celotex" ceiling was installed and the fluorescent recessed louvered luminaires were developed in conjunction with the manufacturers of the ceiling. The space is of irregular shape; the main area is 46 ft. x 36 ft., but there are many off-shoots of varying shapes and sizes. The height of the false ceiling is approximately 10 ft. 9 in. Forty-two luminaires are used, each of which is equipped with two 5-ft. lamps of "Natural" colour. The illumination provided is 25 lm./ft.^{2}.

Designed by: The British Thomson-Houston Co., Ltd.
Installed by: Holland, Hannen and Cubitts, Ltd.

I.E.S. Activities

London

At the sessional meeting held in London on December 8 Mr. H. Hewitt gave a paper on Lighting for Textile Production. The paper examined the progress made in textile lighting since the development of the tubular fluorescent lamp. Visual conditions in the textile industries have improved considerably during this period, partly because of a better appreciation of the benefits of good factory lighting, and partly because of the development of new lamps and new lighting techniques. The more progressive policy of textile manufacturers has led to the elimination of the very poor lighting levels which were often encountered before World War II, and this has resulted in benefits to both managements and workers.

After a brief consideration of the special lighting problems created by the structure of textile premises, the author pointed out that whilst many routine operations do not call for any special degree of visual acuity, there are others for which relatively high levels of illumination are required. This applies particularly to weaving, the basic production process of the textile industry, where artificial lighting now plays an essential part in enabling the weaver to see faults and to repair them, and to observe the quality of the cloth as it is woven. The high levels of illumination provided in some weaving sheds would have been unthinkable 20 years ago, and whilst these levels could usually be justified, the author made a plea for a fuller consideration of the control of glare in designing modern installations.

It is often difficult for an industrial concern to determine the cost of energy used for lighting purposes only. Because of this, and because of the lack of full evidence on maintenance costs, it is rarely possible to make a comprehensive factual comparison of the economics of fluorescent and incandescent lighting. The author, however, after reviewing a good deal of evidence from textile concerns, suggested that where illumination levels of more than 10 lm./ft.^{2} are required fluorescent lamps are almost certain to provide better lighting than incandescent lamps, and their high luminous efficiency and long life tend to make their use more economic. Even for illumination levels below 10 lm./ft.^{2} fluorescent lamps may often be justified, either because of the better quality of lighting which results, because of long burning hours where a factory is engaged on shift work, or because an electrical installation is already fully loaded, leaving no scope for improving the lighting by adding to either the number or wattage of incandescent lamps. As the earlier fears about stroboscopic flicker and poor colour-rendering have now been overcome, it is certain that fluorescent lamps will be still more widely used as the improvement in textile lighting continues.

A brief review of industrial lighting equipment included a reference to the continuous trunking system which the textile industries, along with other industries, are finding acceptable. The author also gave details of how reflectors with a plastic enamel finish are withstanding textile atmospheres, including the humid conditions found in wet spinning-rooms in the flax industry.

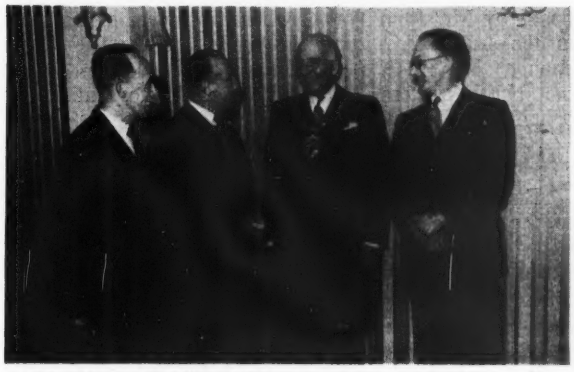
A further section of the paper dealt with the general layout and control of textile lighting installations. The author gave details of cotton mills in which the lighting was controlled by photo-cells, and showed how architectural features in the more modern mills have been used to assist good lighting design. In conclusion, the author showed how the use of fluorescent lamps for inspection and quality control had become a further aid to the textile manufacturer.

Manchester Centre

The annual dinner of the Manchester Centre, held on November 18 at the Café Royal, Manchester, was one of the most successful social events ever held by the Centre. The guests included the Lord Mayor of Manchester, Alderman A. Moss; the I.E.S. President, Mr. W. R. Stevens; and the President of the A.P.L.E., Mr. C. C. Smith.

Mr. J. S. Smyth, chairman of the Centre, said that as a comparative newcomer to Manchester he had been impressed with the friendliness and integrity of the people; he had also found a unity of purpose which was not found in other great cities. He said that the Centre had reasons for being particularly proud to include Alderman Moss as their guest as, amongst his many activities, he had taken a great interest in education and had encouraged the Centre to give lectures to school children.

In replying to Mr. Smyth, the Lord Mayor said that only the previous day the City of Manchester had had



Mr. T. L. Robinson, Mr. W. R. Stevens, The Lord Mayor of Manchester, and Mr. J. S. Smyth at the Manchester Centre dinner on November 18.

good reason to be grateful for the existence of lighting engineers; he recalled that he had had the honour of showing H.R.H. Princess Margaret round the city and that during the course of the tour a thick fog had developed; the citizens of Manchester had lost no time in colling for the street lighting to be switched on—and on the order being given it was switched on without a moment's delay.

The thing that really makes a city, he said, was the people that live in it; the people of Manchester had made the name of their city recognised and honoured throughout the world. That high reputation, he said, should be, and would be, maintained. The educational standards set by Manchester compared very favourably with any in the world; even in this industrial and commercial city business men recognised that there was more in life than just business interests, and Manchester, therefore, set a high standard in cultural activities.

Referring to Ringway Airport the Lord Mayor said that the foresight of those who had been responsible for this great municipal asset was comparable with the foresight of those who had been responsible for the Man-

chester Ship Canal, and in time it would be of equal, if not greater, importance to the city.

Mr. C. C. Smith then proposed the toast of the Society and mentioned his own job as street lighting engineer to the City of Liverpool. He had a few words to say in defence of street lighting columns which, he said, were maligned by architects and assaulted by motorists. He recalled that the Society had had many famous presidents who had contributed to our knowledge of various branches of illuminating engineering, and to whom the Society owed much for the prestige it enjoyed to-day. He said that he was sure that under Mr. Stevens the Society would continue to flourish.

After thanking Mr. Smith for his proposal of the toast Mr. Stevens said that he had no doubt that the Society would continue to do good work, but that it could not exist if people join it only for what they can get out of it. Members, he said, should join with the intention of contributing something to the Society even though that something may only be in attending meetings and thereby helping the work to continue; if people join with the idea of contributing in some small way then he was sure that they would eventually find that they had benefited from their membership.

The toast of the Guests was most entertainingly proposed by Mr. John Walsh, whose ability as a raconteur in the Lancashire idiom is known outside his home county. Mr. H. G. Bell, manager of No. 1 Sub-Area of the North-Western Electricity Board, responded on behalf of the guests.

Birmingham Centre

Pursuing a policy of bringing the work of the Society to the people referred to by Mr. Long in his recent Chairman's Address, the second meeting of the Birmingham Centre during the current session was held in Coventry on Wednesday, October 28, when Mr. R. O. Ackerley spoke on progress in illuminating engineering.

Mr. Ackerley said that there were three contributing parties to lighting progress—the lamp technologist, the lighting engineer, and the illumination research worker. Each major lamp development had influenced lighting practice. Electric lamps had altered steadily and progressively in size, shape, simplicity of operation, brightness, and cost. Increasing filament temperature had resulted in much greater efficiency, and the chemist and physicist had helped with better colour. In fifty years of research we had reached a point where, for practical commercial purposes, filament temperatures were as high as they were ever likely to be. Efficiencies had trebled and a very wide range of all types of lamps had been introduced.

Lighting must create a feeling of comfort and well-being, and not just better visibility. In modern times, with larger sources and cheaper light, the question was "How much light should one have and not how much could one get." In illumination requirements, size of detail, degree of contrast and reflection factor of object had all to be carefully considered, and the British I.E.S. Code was based on the recognition of these factors.

Peeping into the future, Mr. Ackerley contended that the light sources in the days to come would be nothing like so revolutionary as our present gas-filled, discharge, or fluorescent forms. There would also be great improvements in colour and simplicity with a corresponding cheaper cost. As far as lighting equipment was concerned, plastics had a great part to play in both optical and mechanical fields. Lighting practice would centre mainly on comfort.

Members of the Birmingham Centre who attended the meeting on Friday, November 6, at Regent House, Birmingham, were privileged to hear a lecture given by a distinguished scientist of the Birmingham University, Dr. Martin C. Johnson, M.A. The title of the lecture was "Radiation from Space," and was an interesting departure from the usual type of I.E.S. lecture.

Dr. Johnson took his audience through abstract and theoretical fields to the stars, and particularly that most constant of all stars, as far as this earth is concerned, the sun. He described stars as masses of gas of colossal temperatures, sometimes in the neighbourhood of 40,000 degrees, five times as large as the sun with its 6,000 degrees. Dr. Johnson dealt at some length with sun spots, their origin and life, and how they were formed in the sun.

Turning to cosmic rays, Dr. Johnson said that very little was known about them, except perhaps that they were found in the most unexpected places, even at the bottom of coal mines. Cosmic ray particles had an extremely high energy, and at the moment we had no cyclotron or synclotron capable of producing particles of similar or greater energy, although in Birmingham a synclotron was being constructed which would be capable of doing this.

The president and Mr. Long receiving guests at the Birmingham Centre Ladies' Night on November 12.

Nottingham Centre

There was a large and representative audience at the Nottingham meeting on November 12, when Mr. D. C. Lightbody, of the British Broadcasting Corporation, gave a lecture on "Television Studio Lighting." Mr. Lightbody prefaced his remarks by referring to the three main types of camera in use at the Lime Grove Studios, and stated that each demanded different types of lighting technique. He went on to illustrate by lantern slides the very critical locating of light sources, and also gave particulars of the various types that were in general use.

It was evident that the problems of the Lighting Engineer in this comparatively new medium of entertainment differs materially from those found in the legitimate theatre. Mr. Lightbody's talk was greatly appreciated by everyone who was present. The discussion which followed it was opened by Mr. I. A. A. Macdonald, and a vote of thanks was proposed by Mr. N. Rutherford.

Forthcoming I.E.S. Meetings

LONDON

January 12th

Sessional Meeting. "Studies in Interior Lighting," by J. M. Waldram. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

January 26th

Discussion. "Design of Lighting Fittings." Opened by Miscna Black, Grenfell Baines, Mortimer Hawkins, and L. A. Phillips. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

CENTRES AND GROUPS

January 1st

BATH AND BRISTOL.—"Stage Lighting including Latest Developments," by L. G. Applebee. (At Bristol—venue to be announced.)

January 6th

EDINBURGH.—"The Architect's Approach to Artificial Lighting," by R. G. Cox. (At the Conference Room, Manor Club, 12, Rothesay Place, Edinburgh, 3.) 7 p.m.

NEWCASTLE.—Twelfth Night or What You Will—A lighthearted and informative entertainment. (At the Roadway House, 8, Oxford Street, Newcastle-upon-Tyne, 1.) 6.15 p.m.

SWANSEA.—"Flameproof Lighting Equipment for Hazardous Situations," by D. A. Strachan. (At the Minor Hall, Y.M.C.A., Swansea.) 6.30 p.m.

January 7th

CARDIFF.—"Flameproof Lighting Equipment for Hazardous Situations," by D. A. Strachan. (At the South Wales Electricity Board's Demonstration Theatre, The Hayes, Cardiff.) 5.45 p.m.

GLASGOW.—"Architect's Approach to Artificial Lighting," by R. G. Cox. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2.) 6.30 p.m.

GLOUCESTER AND CHELTENHAM.—Architect's Night. (At the Cadena Café, High Street, Cheltenham.) 6.30 p.m.

NOTTINGHAM.—"The Application of Fluorescent Dimming Circuits," by H. H. Ballin. (At the Police Assembly Hall, Shakespeare Street, Nottingham.) 6 p.m.

January 8th

BIRMINGHAM.—Annual Dinner. (At the Midland Hotel, Birmingham.)

January 11th

SHEFFIELD.—"Lighting of Churches," by L. C. Rettig. (At the Medical Library, The University, Western Bank, Sheffield, 10.) 6.30 p.m.

January 12th

BIRMINGHAM.—"Applied Lighting," by E. H. Norgrove. Joint meeting with University of Birmingham Engineering Society. (At The Union, Birmingham University, Edgbaston, Birmingham, 15.) 6 p.m.

January 13th

HUDDERSFIELD.—"Television," by C. Buckle. (At the Yorkshire Electricity Board's Showrooms, Market Street, Huddersfield.) 7.30 p.m.

January 14th

GLASGOW.—Presidential Visit and Social Function. (Details to be announced.)

MANCHESTER.—"Lighting for Textile Production," by H. Hewitt. Joint meeting with the Textile Institute. (At the Textile Institute, 10, Blackfriars Street, Salford.) 6 p.m.

January 15th

EDINBURGH.—Annual Dinner and Dance. (At the Grosvenor Hotel.)

January 19th

LIVERPOOL.—"Industrial Colour Matching Problems," by A. Wilcock. (At the Merseyside and North Wales Electricity Board's Service Centre Lecture Theatre, Whitechapel, Liverpool.) 6 p.m.

January 20th

NORTH LANCASHIRE.—"A Contractor's Lighting Problems," by R. E. Wolstenholme. (At the Demonstration Theatre of the North Western Electricity Board, 19, Friargate, Preston.) 7.15 p.m.

TEES-SIDE.—"Lighting of Rail Grids and Marshalling Yards," by K. Graham. (At the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.) 6.30 p.m. Followed by a visit to Dorman, Long and Co.'s works.

January 21st

BRADFORD.—"Glassware in the Lighting Art," by M. Keenan. (At the Offices of the Yorkshire Electricity Board, Bradford No. 1 Sub Area, 45-53, Sunbridge Road, Bradford.) 7.30 p.m.

January 25th

LEEDS.—"The Effect of Light on the Growth and Development of Plants," by Miss D. Vince. (At the Lecture Theatre of the Lighting Service Bureau, 24, Aire Street, Leeds, 1.) 6.15 p.m.

LEICESTER.—"Signs and Display Lighting," by C. Higgins. (At the Demonstration Theatre of the East Midlands Electricity Board, Charles Street, Leicester.) 7 p.m.

STOKE-ON-TRENT.—Annual Dinner. (At the Grand Hotel, Hanley.)

January 29th

BATH AND BRISTOL.—"The Lighting of Docks and Railway Marshalling Yards," by W. T. F. Souter. (At the South Western Electricity Board Lecture Theatre, Colston Avenue, Bristol.) 6.15 p.m.

BIRMINGHAM.—"Lighting for Sport," by M. W. Peirce. (At "Regent House," St. Phillip's Place, Colmore Row, Birmingham.) 6 p.m.

NEWCASTLE.—Dinner Dance. (At the Royal Turk's Head Hotel.)

Personal

MR. W. L. BEEBY, O.B.E., has been appointed director of the Edison Swan Electric Co., Ltd., in charge of manufacture.

Siemens Electric Lamps and Supplies, Ltd., announce that as from November 1 MR. H. M. HEAD has been appointed acting manager of their Dublin branch in place of the late Mr. L. E. Donovan. MR. W. J. MEADEN has become assistant branch manager.

Siemens Electric Lamps and Supplies, Ltd., also announce that MR. J. A. E. TRINDER has joined the company as home sales manager for Siemens' products. The appointment dates from December 1; Mr. Trinder is based on the London office.

Ekco-Ensign Electric, Ltd., announce the recent appointment of MR. C. T. IVES as their representative covering part of the south-western postal districts of London. He will operate from the company's southern sales office at 45, Essex Street, Strand, London, W.C.2.

MR. F. E. LONDON will shortly be representing Venner, Ltd., in the Yorkshire and North-Eastern Electricity Board areas, the appointment being an addition to the present outside sales force.

MR. ERNEST STROUD announces that he is no longer connected with the Brighton Lighting and Electrical Engineering Co., Ltd., and that private communications should be addressed to him at his home address, 42, Croft Avenue, Southwick, Sussex.

MR. K. F. TEBBUTT, light group representative for Philips Electrical, Ltd., in the Warwickshire area since 1947, completed 25 years' service with the company on October 26, 1953.

On November 9, 1953, MR. H. W. WILSON, manager of the Southampton branch of The General Electric Co., Ltd., since 1938, took up a new appointment as an assistant to Mr. W. J. Bird, London sales manager. His successor as manager of Southampton branch is MR. D. E. KIDNER.

Obituary

JEAN AYRAL

It is with deep regret that we report the death, on November 18 in a car accident, of M. Jean Ayral. Born in Paris in 1885, Jean Ayral was educated at the Ecole Polytechnic, from which he graduated in 1909 when he then joined the Compagnie Francaise Thomson-Houston. In 1922 he joined the Compagnie des Lampes, were, two years later, he took charge of the factories. Lamp manufacture had always been his main interest, and even though he had passed the normal age of retirement he continued to act in an advisory capacity to the Compagnie des Lampes.

Internationally he was known for his work in connection with standardisation of lamp performance and colour rendering. His opinions and advice were held in great respect. His sudden and tragic end has come as a great shock; we extend our sincere sympathy to his wife and daughter.

POSTSCRIPT By "Lumeritas"

Despite all the modern equipment for stage lighting which is available and installed in our well-known theatres, the actual lighting effects obtained are at the discretion of the producer and may be unsatisfactory to the audience. A recent performance of "Siegfried" at Covent Garden provoked criticism on this score. One critic wrote that during the whole performance it was not for more than 30 minutes that he found it possible to see, even dimly, what was afoot. He recalled another occasion when, after a badly lit first act, Sir Thomas Beecham is reported to have remarked: "In order to discern which opera it is which is being performed, I find myself obliged to listen to the music!" The Arts Council, said the critic, should establish a school of opera production at the Garden "so that eventually we may have someone who has tumbled to the elementary fact that the primary purpose of lighting, on the stage as elsewhere, is to reveal."

In the previous issue of the Journal Mr. W. Robinson told us, amusingly, what he thinks is wrong with present-day lighting fittings, and—to use a present-day colloquialism—I couldn't agree more with some of his remarks about the design and cost of some fluorescent luminaires. The contemporary "domestic" lighting fittings—particularly those of the portable variety—which he satires and which are now in abundant supply, can be "a source of innocent merriment" but, so far as I am concerned, the price tags attached to them are sources of indignation. Two floor standards come to my mind and will serve as examples: (a) consists of about 5 ft. of ¼ in. dia. painted hoop iron with 4 ft. of the same material welded to the upright, a lamp-holder fitted with painted metal reflector, a length of flex and a cheap "plastic" switch—price £5 5s. 0d.; (b) has three short legs of superior quality broomstick, which support (precariously) a column constructed of three slender wooden curtain rods anchored in the middle and at both ends to small pieces of wood, a lamp-holder, flex and plastic switch—price, also, £5 5s. 0d. This rickety contraption can be had complete with umbrella-size buckram shade for only £10 10s. 0d. It should not be placed in a draught in case it becomes airborne!

At Southport—where the I.E.S. Summer Meeting is to be held this year—the municipal Lighting Committee has recently recommended that the street lamps be kept alight until midnight, instead of being extinguished at 11.30 p.m. as hitherto. Commenting on this recommendation, the "Southport Guardian" makes the point, made many years ago—apropos gas lighting—by the American essayist R. W. Emerson, that good street illumination is the enemy of crime. It appears that some alarm has been caused by recent night attacks on women and children in the Southport area, but, apart from this, the "Guardian" urges better lighting of minor streets and welcomes the decision of the Town Council to install sodium lighting on some of the most dangerous stretches of highway in the borough. The use of sodium lighting for streets is extending rapidly, and the Minister of Transport was recently asked in the House if he would agree that it is the best form of street lighting and, incidentally, an answer to the dazzle problem. Would he recommend that local authorities should install it wherever possible in built-up areas? To these questions the Minister replied that it is difficult to dogmatise on this matter, and unwise to lay down a general rule.

My light-hearted attempt (Postscript, June, 1953) to secure Anglo-American acceptance of a short name for the unit of illumination has not been so completely ignored on the other side of the Atlantic as it has been here. The November issue of "Illuminating Engineering" contains a similarly light-hearted letter to the Editor on this subject from a correspondent who signs himself "Luxamericanus." "Lumeritas," he says, "proposes the term 'Ez' and backs it up with reasoning which is a masterpiece of logic. I have one main objection to his proposed term, however. On my desk I use as a paper-weight a 3-D 'footcandle' (illustration supplied). You can't very well use an 'Ez' as a paper-weight, now can you?" The 3-D "footcandle" is a cast of a hefty foot severed from the leg through the ankle, with a small flame rising from the plane of amputation. An acquaintance of mine tells me he has seen this amusing emblem, which goes to show that there can be more than one conception of a foot-candle! But the fact that an "Ez" cannot be used as a paper-weight is a very good reason for its adoption as a name for the unit of illumination! It is not open to misconception; it suggests no false ideas; in fact, like ohm, watt, and the like, it means "nowt" to anybody until its definition is known, and then it means "nowt else." So I suggest that "Luxamericanus" keeps his 3-D "footcandle" paper-weight in memory of the early struggles of illuminating engineering towards an adequate and suitable terminology, and lets "Ez" reveal the papers on his desk without the added duty of making them "stay put"!

The author of an article published recently by "The Recorder Weekly" suggested that the incidence of defective vision in this country is growing, and that it is reasonable to suspect that this may be due to the extending use of fluorescent lighting. Poor fluorescent lighting! What a lot it has to answer for according to some people! However, there is no evidence of any greater prevalence of defective vision anywhere since the introduction of fluorescent lighting. Unfortunately, some members of the lay public often accept suggestions of this kind quite uncritically. One reader of the article in question wrote to the Editor of "The Recorder Weekly" not only accepting the suggested relation between the spread of fluorescent lighting and the incidence of defective sight, but going further and suggesting that investigation has shown that the number of spectacle wearers of any nation is in direct proportion to the amount of electrical current generated per head of the population! So it is not only the use of fluorescent lighting that is increasing the incidence of bad sight, but also the increasing use of washing machines, electric irons, fires and all other electric appliances!